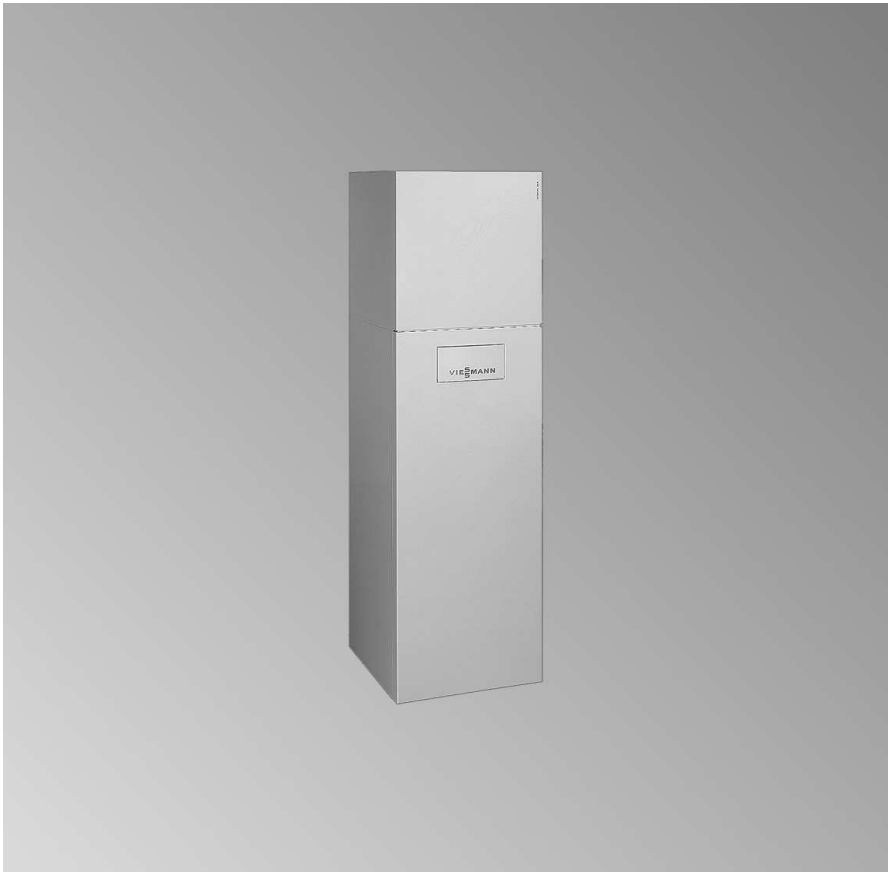
Installation and service instructions

for contractors

Vitocal 242-G/222-G
Type CHE
Compact Energy Tower for low energy houses

For applicability, see the last page

VITOCAL 242-G/222-G



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Please keep safe.

Safety instructions

Please follow these safety instructions closely to prevent accidents and material losses.

Safety instructions explained

Danger
This symbol warns against the risk of injury.

Please note
This symbol warns against the risk of material losses and environmental pollution.

Note
Details identified by the word "Note" contain additional information.

Target group

These instructions are exclusively designed for qualified personnel.

- Work on gas equipment must only be carried out by a qualified gas fitter.
- Work on electrical equipment must only be carried out by a qualified electrician.
- The system must be commissioned by the system installer or a qualified person authorised by the installer.

Regulations

Observe the following when working on this system

- all legal instructions regarding the prevention of accidents,
- all legal instructions regarding environmental protection,
- the Code of Practice of relevant trade associations,
- all current safety regulations as defined by DIN, EN, DVGW, TRGI, TRF, VDE and all locally applicable standards.

If you smell gas

Danger
Escaping gas can lead to explosions which may result in serious injury.

- Never smoke. Prevent naked flames and sparks. Never switch lights or electrical appliances ON or OFF.
- Close the gas shut-off valve.
- Open windows and doors.
- Remove all people from the danger zone.
- Notify your gas or electricity supplier from outside the building.
- Shut off the electricity supply to the building from a safe place (outside the building).

If you smell flue gas

Danger
Flue gas can lead to life-threatening poisoning.

- Shut down the heating system.
- Ventilate the boiler room.
- Close all doors leading to the living space.

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Safety instructions (cont.)

Working on the system

- When using gas as fuel, also close the main gas shut-off valve and safeguard against unauthorised reopening.
- Isolate the system from the power supply and check that it is no longer 'live', e.g. by removing a separate fuse or by means of a main isolator.
- Safeguard the system against unauthorised reconnection.

Please note
Electronic modules can be damaged by electro-static discharges.
Touch earthed objects, such as heating or water pipes, to discharge static loads.

Repair work

Please note
Repairing components which fulfil a safety function can compromise the safe operation of your heating system.
Replace faulty components only with original Viessmann spare parts.

Ancillary components, spare and wearing parts

Please note
Spare and wearing parts which have not been tested together with the heating system can compromise its function. Installing non-authorised components and non-approved modifications/conversion can compromise safety and may invalidate our warranty.
For replacements, use only original spare parts from Viessmann or those which are approved by Viessmann.

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Transport

Please transport the unit in the crate to protect it from damage. The crate can be dismantled if the amount of available space is limited.
Leave the pallet beneath the unit for transportation.
We recommend you transport the equipment on a Viessmann trolley.
Secure the unit with tension straps.
The **max. permitted tilting angle** for the compressor during transportation and installation is 30°.

Please note
To avoid damage during transportation without the pallet, **never** put weight onto the top, front or side walls of the unit. **Never** support the equipment on its front or side panels.

Standard dimensions when tilted

Equipment on pallet	2 395 mm
Equipment alone	2 085 mm

Positioning

Installation room requirements

Required room height when utilising the connection panel: 2400 mm (min).

Note
To prevent damage to the building structure, please pay attention to the permissible load-bearing capacity of the floor.

Type	Total weight incl. DHW kg
BWT 106	520
BWT 108	530
BWT 110	535

The installation room must be dry and safe from the risk of frost.
To prevent corrosion damage, provide the brine-side heat pump installation with thermal insulation in accordance with current rules as vapour diffusion proof installation.
To prevent structure-borne noise, never set up the unit on wooden ceilings in the attic.

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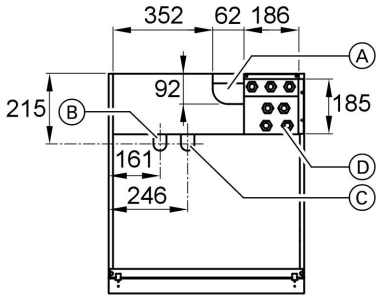
Positioning (cont.)

Top panel dimensions (plan view)



Ⓐ Cable entry (length of cables in unit approx. 1300 mm)
Ⓑ Primary outlet
Ⓒ Primary inlet
Ⓓ Hydraulic connection array

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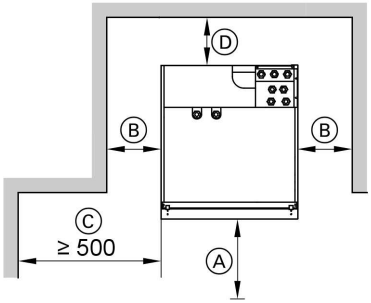
Positioning (cont.)

Clearance dimensions (plan view)



Ⓐ min. 1000 mm
Ⓑ **Vitocal 242:**
The required clearance for the removal of the front panels is 20 mm. Also maintain this dimension when using decorative frames.
Vitocal 222:
Maintain a clearance of 140 mm to the left or right for the blow-off line of the heating circuit safety valve.
Ⓒ Optionally on the l.h. or r.h. side
Ⓓ **Vitocal 242:** min. 15 mm (see also page 57)
Vitocal 222: min. 45 mm (see also page 59)
Maximum distance:
For distances > 80 mm fit the power cables on site with strain relief fittings.

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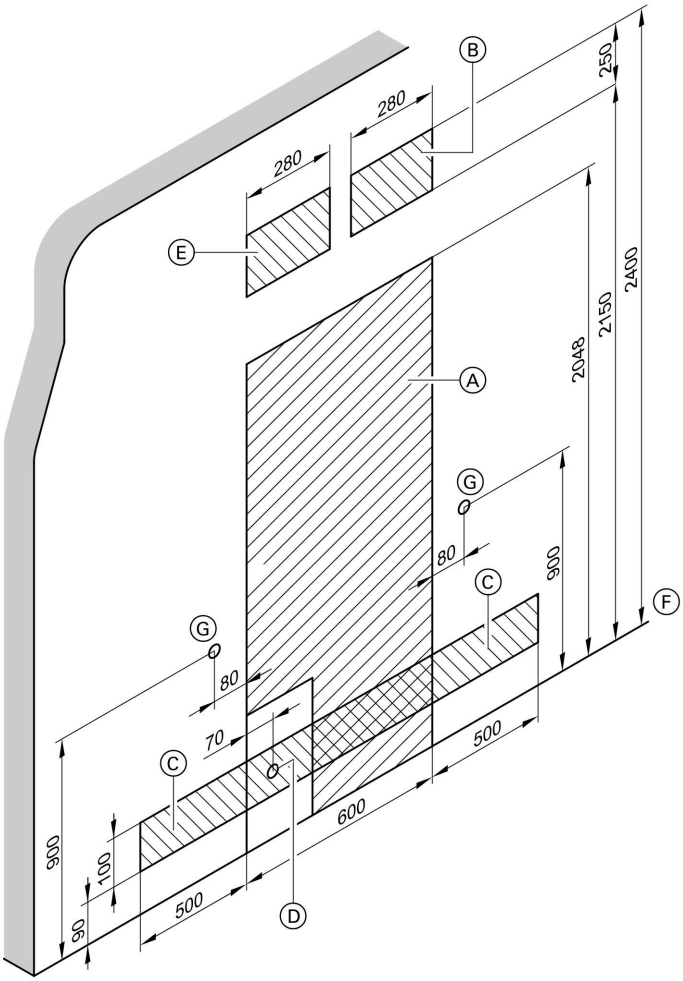
Positioning (cont.)

On-site connection requirements



Ⓐ Appliance dimensions
Ⓑ Recommended outlet area of on-site hydraulic connections (compulsory when installing with a connection panel)
Ⓒ **Only Vitocal 242:**
Possible position (pipe centre) of the on-site drain connection DN 32 for condensate with a wall clearance of > 45 mm

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Positioning (cont.)

Ⓓ **Only Vitocal 242:**
Position (centre pipe) of the on-site drain connection DN 32 for condensate with a wall clearance from 15 to 45 mm

Ⓔ Possible exit area of brine-side connections and/or on-site cables.

Ⓕ Top edge – finished floor

Ⓖ **Only Vitocal 222:**
Possible position (pipe centre) of the on-site drain connection DN 40 for the blow-off line of the heating circuit safety valve. Install a siphon on site

Overview of available system versions

The following table provides an overview of **all** possible system versions. The designs on the following pages are **representative** for four typical heat pump systems.

System layout inside the control unit	Standard equipment			Additional equipment (only one option per system design)		"Natural cooling"
	Direct heating circuit	Heating circuit with mixer	DHW cylinder	Buffer cylinder	Low loss header	
2	X		X	X		X
					X	
4		X	X	X		X
6	X	X	X	X		X
					X	

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Function description of systems

Note
Never operate 230 V units in (D).
A pre-requisite for operating 230 V units in ***some countries*** *is that* ***starting currents of up to 45 A*** *are permissible in the power grid of the country concerned (observe other country-specific regulations, if necessary).*
The sample applications are recommendations and must be ***checked*** *for completeness and functionality* ***on site****. Please observe the applicable regulations and directives for design, installation and operation.*

Heating circuit

Heat pumps require a **minimum** heating water throughput. **Ensure** that the values specified in the relevant datasheet **are maintained**.
Accurately calculated radiator heating systems generally have a small system water content. With systems like these, use a heating water buffer cylinder with an appropriate capacity to prevent the heat pump from being switched on and off at frequent intervals.
Heat pumps can be shut off by the power supply utility at peak load periods depending on the power tariff. For this reason a heating water buffer cylinder should be installed for rapidly cooling heating systems (radiators). The volume of the heating water buffer cylinder should be sufficient to prevent the stored heat from allowing the building to cool down during power-OFF periods.

System versions 2 to 4 do not use a secondary pump but a separate circulation pump as heating circuit pump. We recommend the use of a heating circuit pump with a slower flow rate than the secondary pump. Install a heating water buffer cylinder in parallel to the heating circuit to compensate for the difference between these water volumes.
Systems with large volumes, e.g. underfloor heating systems, will not necessarily require a heating water buffer cylinder. In these heating systems install an overflow valve at the underfloor heating system heating circuit distributor that is furthest away from the heat pump. This ensures that the minimum water circulation volume is provided, even in closed heating circuits.
If an instantaneous heating water heater is installed, a temperature limiter (accessory, order no. 7151 728 or 7151 729) must be installed in conjunction with an underfloor heating circuit. Install the temperature limiter, for example, on the underfloor heating circuit pump.

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Function description of systems (cont.)

Heating water buffer cylinder operated in parallel

Heating water buffer cylinders provide a hydraulic separation of the flow in the heat pump and heating circuits.
For example, the flow rate in the heat pump circuit remains constant, even if the heating circuit flow rate is reduced by thermostatic valves.
The use of a heating water buffer cylinder offers the following advantages:

- Bridging power-OFF periods
- Constant flow rate through the heat pump
- Longer heat pump operating times

Because of the increased water volume of the heat source and the fact that it may have a separate shut-off facility, an additional (or larger) expansion vessel should be provided.
Protect the heat pump with a fuse in accordance with DIN 4751 [or local regulations].

Systems without heating water buffer cylinder

Never install a mixer to safeguard the minimum heating water circulation volume.

Natural cooling function

During the summer months the temperature level of the primary circuit can be used to cool the building.
The natural cooling function is a method of cooling buildings that saves a considerable amount of energy. All that is needed is a small amount of electricity for the circulation pumps to access the "cooling source" in the ground.

During the cooling operation, the heat pump will only be started to provide DHW. The heat pump control system actuates the circulation pumps, diverter valves and mixers and records the temperature via the natural cooling extension kit. Alternatively, this function can also be covered by on-site components (for an on-site wiring suggestion, see the Vitocal 200/222/242 technical guide).
A contact humidistat monitors the dew point.
The capability of the natural cooling function cannot generally be compared with that of air-conditioning equipment or water chillers. Natural cooling provides no dehumidification.

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Function description of systems (cont.)

The cooling capacity depends on the heat source temperature, which itself is subject to seasonal fluctuations. Experience has shown that the cooling capacity is higher at the beginning of summer than at the end.
In addition, the water source temperature curve is subject to the cooling demand of the building. Because of large window areas or internal sources (lighting, electrical equipment), the heat source temperature increases more rapidly during the course of a year than it does if less cooling is required.

Underfloor heating systems and concrete core tempering are available for cooling the building; radiator heating systems are unsuitable for this purpose. Ensure that any installed room thermostats are able to be opened manually or by servomotors when using the cooling function.

DHW heating with the heat pump

In the delivered condition, domestic hot water heating by the heat pump is given priority in the heating circuit and should preferably take place overnight.

During cylinder heating, the control unit switches the circulation pump OFF to prevent the cylinder heating from being impaired.

DHW heating with solar boost (only Vitocal 242)

If sufficient solar radiation is available, the DHW can be heated exclusively by the solar heating system.
To optimise the solar cover, heating the DHW cylinder by heat pump should be limited to the upper cylinder volume. This is achieved via an integral, manually activated three-way diverter valve.

During cylinder heating, the control unit switches the circulation pump OFF to prevent the cylinder heating from being impaired.

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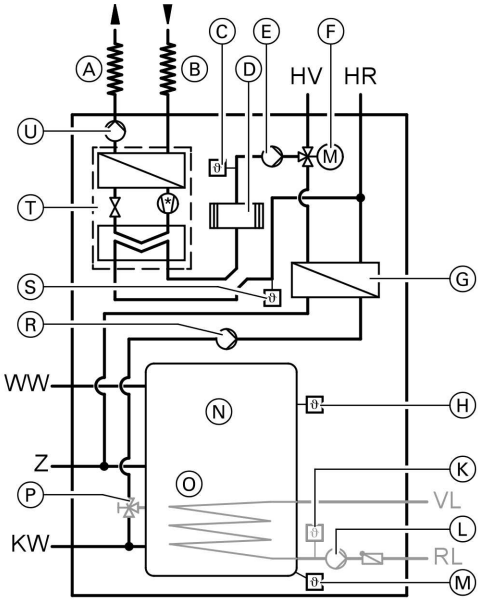
Function description of systems (cont.)

Overview of the internal components



HR Heating return
HV Heating flow
KW Cold water (connections, see from page 94)
RL Solar return **(only Vitocal 242)**
VL Solar flow **(only Vitocal 242)**
WW DHW
Z DHW circulation
Ⓐ Primary return (primary outlet)
Ⓑ Primary flow (primary inlet)
Ⓒ Flow temperature sensor; secondary circuit
Ⓓ Instantaneous heating water heater
Ⓔ Secondary pump
Ⓕ Three-way diverter valve "Central heating/DHW"
Ⓖ Plate-type heat exchanger for cylinder heating
Ⓗ Upper cylinder temperature sensor
Ⓚ Return temperature sensor of the solar circuit **(only Vitocal 242)**
Ⓛ Solar circuit pump **(only Vitocal 242)**
Ⓜ Lower cylinder temperature sensor
Ⓝ DHW cylinder
Ⓞ Solar heat exchanger **(only Vitocal 242)**
Ⓟ Three-way diverter valve (manual) **(only Vitocal 242)**
Ⓡ Cylinder primary pump
Ⓢ Return temperature sensor; secondary circuit
Ⓣ Heat pump module
Ⓤ Primary pump

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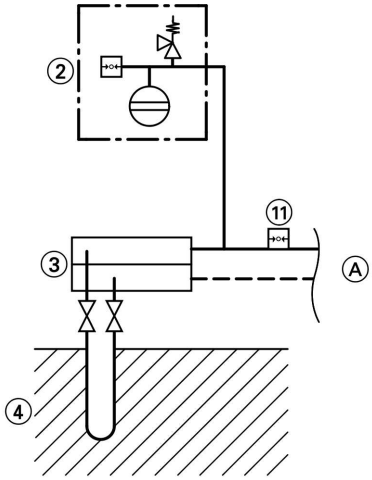
System version on the primary side

Hydraulic diagram



Ⓐ Heat pump interface (see from page 19)
② Brine accessory pack
③ Brine distributor for geothermal probes/collectors
④ Geothermal probes/geothermal collectors
⑪ Brine circuit pressure switch

Electrical connection

Pressure switch connection for brine circuit, ⑪ see page 21.

Equipment required

Pos.	Description	Number
②	Brine accessory pack	1
③	Brine distributor for geothermal probes/collectors	as required
④	Geothermal probes/geothermal collectors	as required
⑪	Brine circuit pressure switch	1

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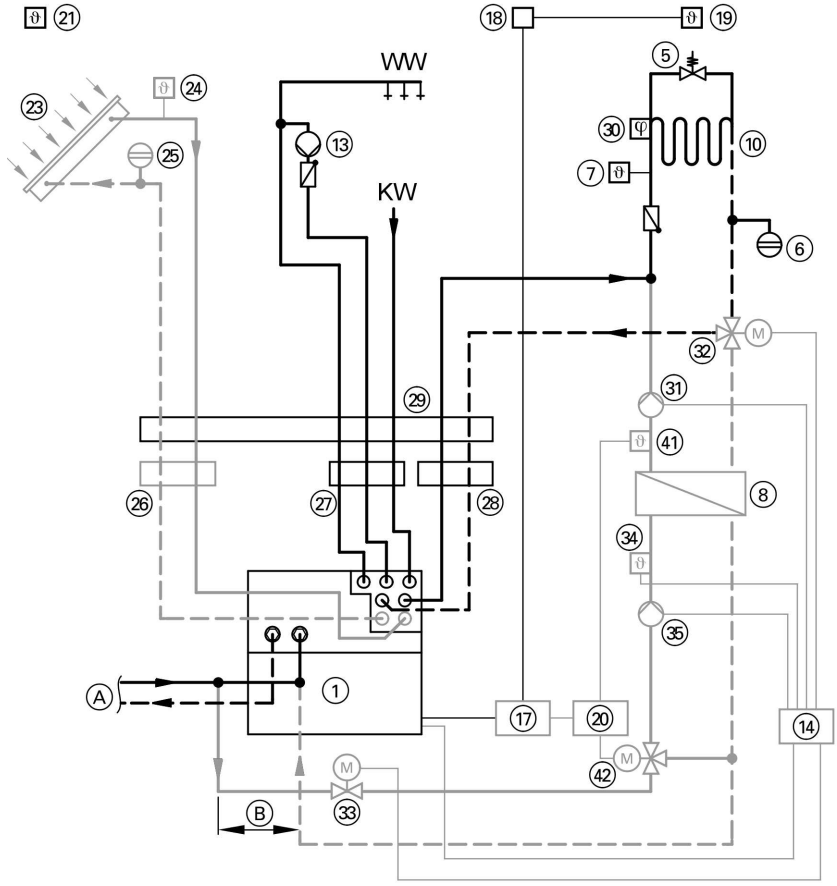
System version 1

One directly connected heating circuit, DHW heating with solar boost (option) and natural cooling function (option)

Note
Solar boosted *DHW heating is only possible with the* ***Vitocal 242****.*
To achieve this system version, select ***system design 2*** *at the control unit.*

Hydraulic diagram



System version 1 (cont.)

Ⓐ Primary side interface (see from page 18)
Ⓑ Min. 500 mm (for hydraulic separation)
① Compact Energy Tower
⑤ Overflow valve
⑥ Diaphragm expansion vessel heating circuit
⑦ Temperature limiter underfloor heating circuit (connection see page 68)
⑧ Plate-type heat exchanger
⑩ Underfloor heating circuit
⑬ DHW circulation pump
⑭ Natural cooling extension kit
⑰ KM BUS distributor
⑱ Vitotrol 200 remote control
⑲ Room temperature sensor
⑳ Extension kit for cooling circuit with mixer
㉑ Outside temperature sensor
㉗ DHW circulation extension
㉘ Heating circuit extension
㉙ Connection panel
㉚ Contact humidistat
㉛ Circulation pump (secondary cooling circuit pump)
㉜ Three-way diverter valve heating/cooling
㉝ 2-way motorised ball valve
㉞ Frost stat
㉟ Circulation pump (primary cooling circuit pump)
㊶ Cooling circuit flow temperature sensor
㊷ Cooling circuit mixer motor

Only in conjunction with Vitocal 242:
㉓ Solar collector
㉔ Collector temperature sensor
㉕ Diaphragm expansion vessel, solar circuit
㉖ Solar circuit extension

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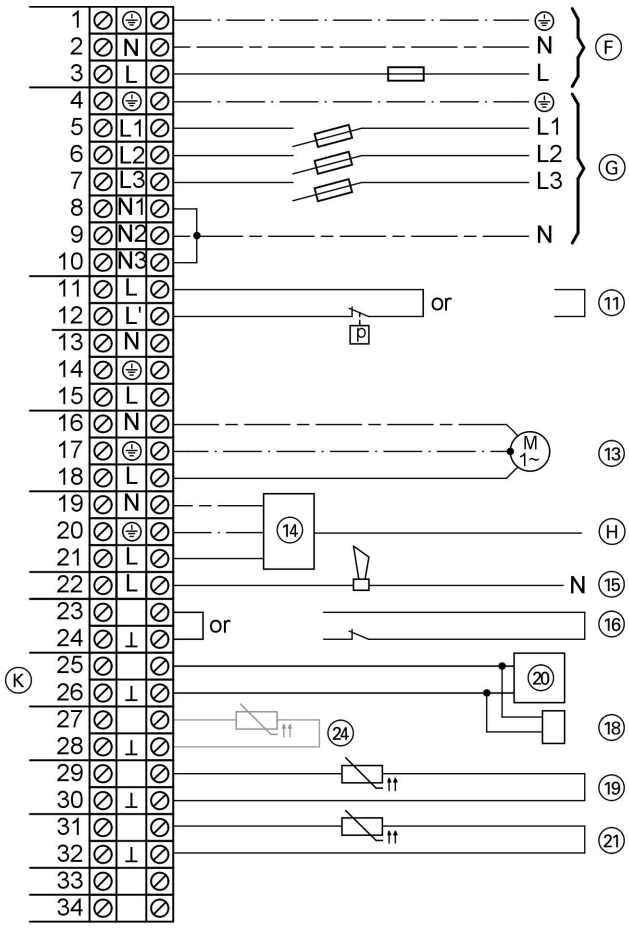
System version 1 (cont.)

Electrical connection (400 V versions)

Connections at the main connection area X60

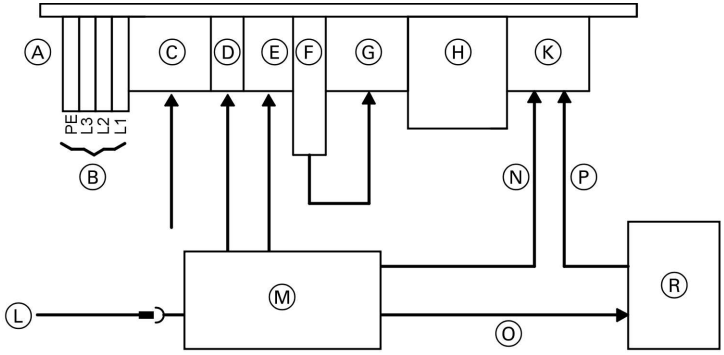


- (F) Control unit power connection (230 V)
- (G) Instantaneous heating water heater power cable
- (H) External connections at natural cooling extension kit
- (K) KM BUS
- (11) Brine circuit pressure switch (if the pressure switch is **not** installed, **use** the jumper provided)
- (13) DHW circulation pump

System version 1 (cont.)

⑭ Natural cooling extension kit
⑮ Central fault message (230 V)
⑯ Power-OFF
⑱ KM BUS: Vitotrol 200 remote control (with room temperature sensor), see also page 67
⑲ Room temperature sensor (if no remote control is installed), see also page 67
⑳ KM BUS: Cooling circuit extension kit
㉑ Outside temperature sensor
㉔ Collector temperature sensor **(only with Vitocal 242)**

Connections to control module X80, 400 V



Ⓐ Front of control module (with type plate)
Ⓑ Compressor power supply
Ⓒ Internal connection to control panel
Ⓓ Primary pump connection (230 V)
Ⓔ Compressor safety chain connection
Ⓕ Phase monitor
Ⓖ Phase monitor connection
Ⓗ Compressor contactor
Ⓚ Compressor or full wave soft starter connection
Ⓛ Primary temperature sensor (for control purposes)
Ⓜ Heat pump module
Ⓝ Direct connection only with BWT 106
Ⓞ Connection required as of BWT 108
Ⓟ Connection required as of BWT 108
Ⓡ Full wave soft starter (as of BWT 108)

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System version 1 (cont.)

Information regarding other connections

The primary pump, the secondary pump, the instantaneous heating water heater and the central heating/DHW three-way diverter valve have already been connected in the factory.

Components to be connected	Connection description
Only with natural cooling: Connect the required components to extension kit ⑳ and natural cooling ⑭ extension kit	See separate installation instructions
Only when using an underfloor heating system: Connect temperature limiter	see page 68

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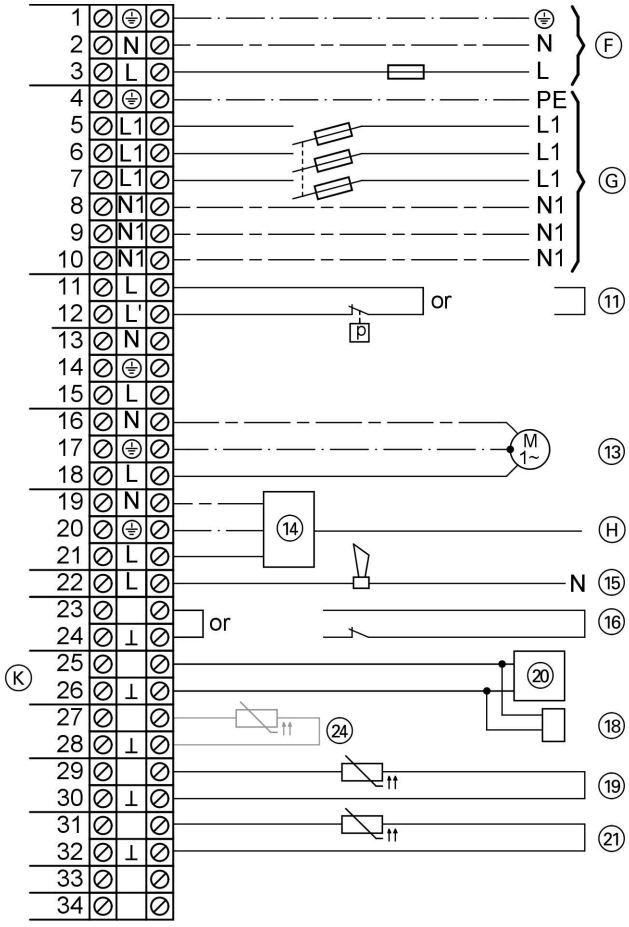
System version 1 (cont.)

Electrical connection (230 V versions)*1

Connections at the main connection area X60



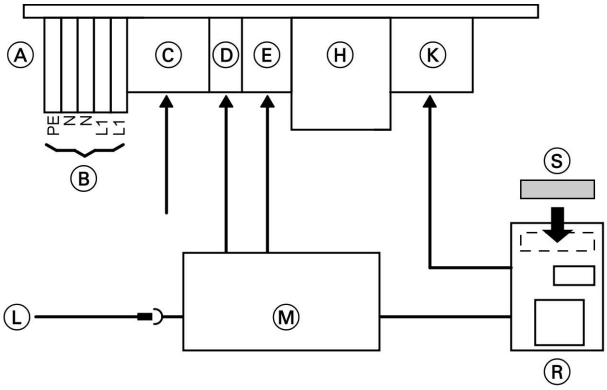
Ⓕ Control unit power supply
Ⓖ Instantaneous heating water heater power cable (circuit breakers **must** be blocked)
Ⓗ External connections at natural cooling extension kit
Ⓚ KM BUS

*1 *Never operate 230 V units in Ⓓ. For more information, see page 14.*

System version 1 (cont.)

⑪ Brine circuit pressure switch (if the pressure switch is **not** installed, **use** the jumper provided)
⑬ DHW circulation pump
⑭ Natural cooling extension kit
⑮ Central fault message
⑯ Power-OFF
⑱ KM BUS: Vitotrol 200 remote control (with room temperature sensor), see also page 67
⑲ Room temperature sensor (if no remote control is installed), see also page 67
⑳ KM BUS: Cooling circuit extension kit
㉑ Outside temperature sensor
㉔ Collector temperature sensor **(only with Vitocal 242)**

Connections to control module X80, 230 V



Ⓐ Front of control module (with type plate)
Ⓑ Compressor power supply
Ⓒ Internal connection to control panel
Ⓓ Primary pump connection
Ⓔ Compressor safety chain connection
Ⓗ Compressor contactor
Ⓚ Full wave soft starter connection
Ⓛ Primary temperature sensor (for control purposes)
Ⓜ Heat pump module
Ⓡ Full wave soft starter
Ⓢ Capacitor

Information regarding other connections

The primary pump, the secondary pump, the instantaneous heating water heater and the central heating/DHW three-way diverter valve have already been connected in the factory.

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System version 1 (cont.)

Components to be connected	Connection description
Connect capacitor to full wave soft starter	see page 89
Only with natural cooling: Connect the required components to extension kit ⑳ and natural cooling ⑭ extension kit	See separate installation instructions
Only when using an underfloor heating system: Connect temperature limiter	see page 68

Equipment required for system version 1

Equipment required

Pos.	Description	Number
①	Compact Energy Tower	1
⑤	Overflow valve	1
⑥	Diaphragm expansion vessel for the heating circuit	1
⑦	Temperature limiter (only required for the underfloor heating circuit)	1
⑩	Underfloor heating circuit	1
⑰	KM BUS distributor	1
⑱	Vitotrol 200 remote control	1
⑲	Room temperature sensor	1
㉘	Heating circuit extension	1
㉙	Connection panel	1
	DHW circulation option	
⑬	DHW circulation pump	1
㉗	DHW circulation extension	1
	Option solar heating circuit (only with Vitocal 242)	
㉓	Solar collectors	as required
㉔	Collector temperature sensor	1
㉕	Diaphragm expansion vessel for the solar circuit	1
㉖	Solar circuit extension	1
	Option "Natural cooling" function	
⑧	Vitotrans 100, plate-type heat exchanger	1
⑭	Natural cooling extension kit	1
⑳	Extension kit for cooling circuit with mixer	1
㉚	Natural cooling contact humidistat	1
㉛	Circulation pump (secondary cooling circuit pump)	1
㉜	Three-way diverter valve heating/cooling	1
㉝	Motorised two-way ball valve (for the brine circuit)	1
㉞	Frost stat	1
㉟	Circulation pump (primary cooling circuit pump)	1

System version 1 (cont.)

Pos.	Description	Number
㊶	Cooling circuit flow temperature sensor	1
㊷	Cooling circuit mixer motor	1

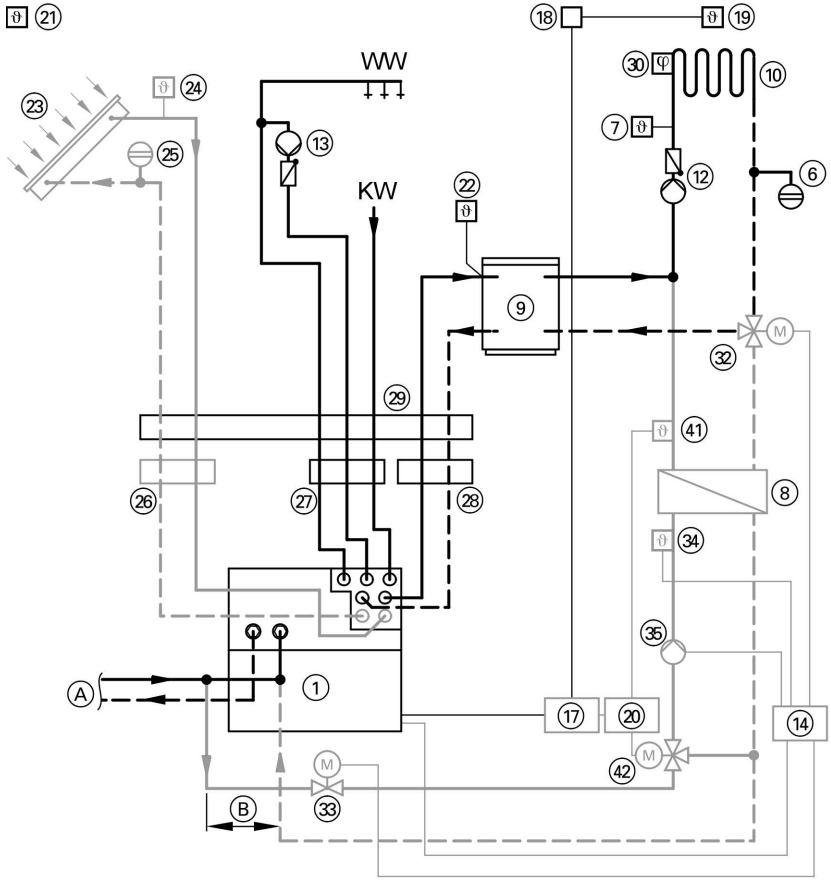
System version 2

One directly connected heating circuit with heating water buffer cylinder, DHW heating with solar boost (option) and natural cooling function (option)

Note
***Solar boosted** DHW heating is only possible with the **Vitocal 242**.*
*To achieve this system version, select **system design 2** at the control unit.*

System version 2 (cont.)

Hydraulic diagram



Ⓐ Primary side interface (see from page 18)
Ⓑ Min. 500 mm (for hydraulic separation)
① Compact Energy Tower
⑥ Diaphragm expansion vessel heating circuit
⑦ Underfloor heating circuit temperature limiter
⑧ Plate-type heat exchanger
⑨ Heating water buffer cylinder
⑩ Underfloor heating circuit
⑫ Heating circuit pump, direct heating circuit
⑬ DHW circulation pump
⑭ Natural cooling extension kit
⑰ KM BUS distributor
⑱ Vitotrol 200 remote control

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System version 2 (cont.)

⑲ Room temperature sensor
⑳ Extension kit for cooling circuit with mixer
㉑ Outside temperature sensor
㉒ Heating water buffer cylinder temperature sensor
㉗ DHW circulation extension
㉘ Heating circuit extension
㉙ Connection panel
㉚ Contact humidistat
㉜ Three-way diverter valve heating/cooling
㉝ 2-way motorised ball valve
㉞ Frost stat
㉟ Circulation pump (primary cooling circuit pump)
㊶ Cooling circuit flow temperature sensor
㊷ Cooling circuit mixer motor

Only in conjunction with Vitocal 242:

㉓ Solar collector
㉔ Collector temperature sensor
㉕ Diaphragm expansion vessel, solar circuit
㉖ Solar circuit extension

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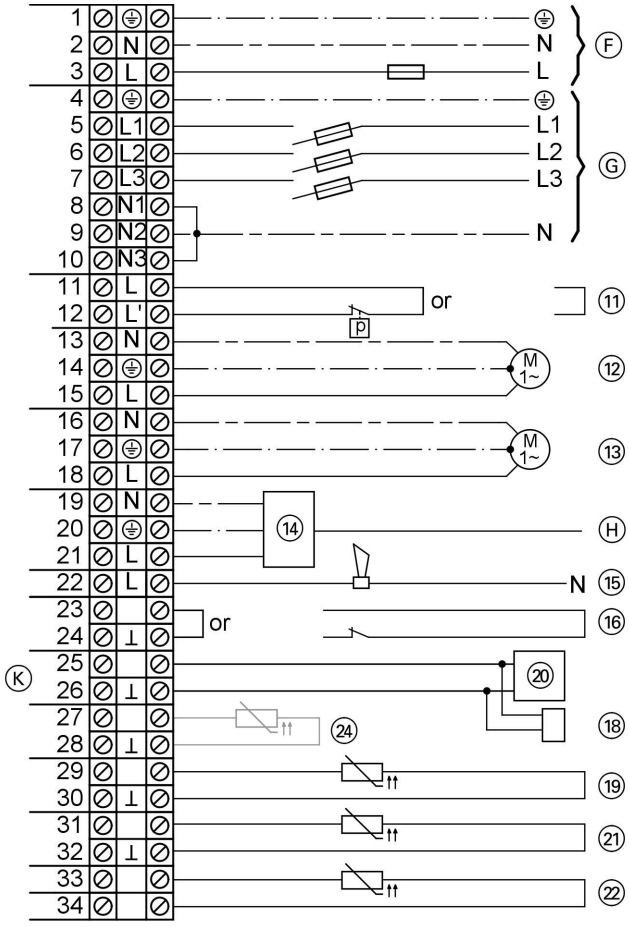
System version 2 (cont.)

Electrical connection (400 V versions)

Connections at the main connection area X60

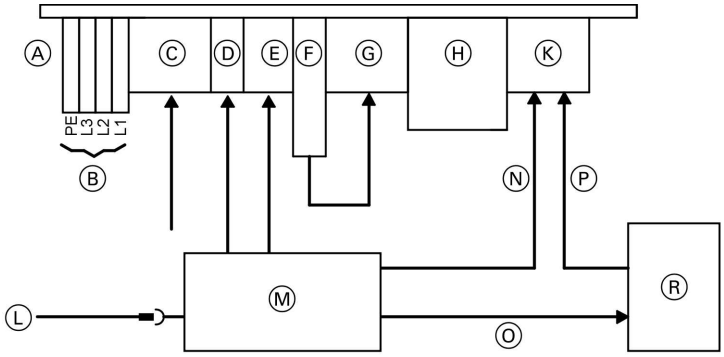


Ⓕ Control unit power connection (230 V)
Ⓖ Instantaneous heating water heater power cable
Ⓗ External connections at natural cooling extension kit
Ⓚ KM BUS
⑪ Brine circuit pressure switch (if the pressure switch is **not** installed, **use** the jumper provided)

System version 2 (cont.)

⑫ Heating circuit pump, direct heating circuit
⑬ DHW circulation pump
⑭ Natural cooling extension kit
⑮ Central fault message (230 V)
⑯ Power-OFF
⑱ KM BUS: Vitotrol 200 remote control (with room temperature sensor), see also page 67
⑲ Room temperature sensor (if no remote control is installed), see also page 67
⑳ KM BUS: Cooling circuit extension kit
㉑ Outside temperature sensor
㉒ Heating water buffer cylinder temperature sensor
㉔ Collector temperature sensor **(only with Vitocal 242)**

Connections to control module X80, 400 V



Ⓐ Front of control module (with type plate)
Ⓑ Compressor power supply
Ⓒ Internal connection to control panel
Ⓓ Primary pump connection (230 V)
Ⓔ Compressor safety chain connection
Ⓕ Phase monitor
Ⓖ Phase monitor connection
Ⓗ Compressor contactor
Ⓚ Compressor or full wave soft starter connection
Ⓛ Primary temperature sensor (for control purposes)
Ⓜ Heat pump module
Ⓝ Direct connection only with BWT 106
Ⓞ Connection required as of BWT 108
Ⓟ Connection required as of BWT 108
Ⓡ Full wave soft starter (as of BWT 108)

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System version 2 (cont.)

Information regarding other connections

The primary pump, the secondary pump, the instantaneous heating water heater and the central heating/DHW three-way diverter valve have already been connected in the factory.

Components to be connected	Connection description
Only with natural cooling: Connect the required components to extension kit ⑳ and natural cooling ⑭ extension kit	See separate installation instructions
Only when using an underfloor heating system: Connect temperature limiter	See separate installation instructions

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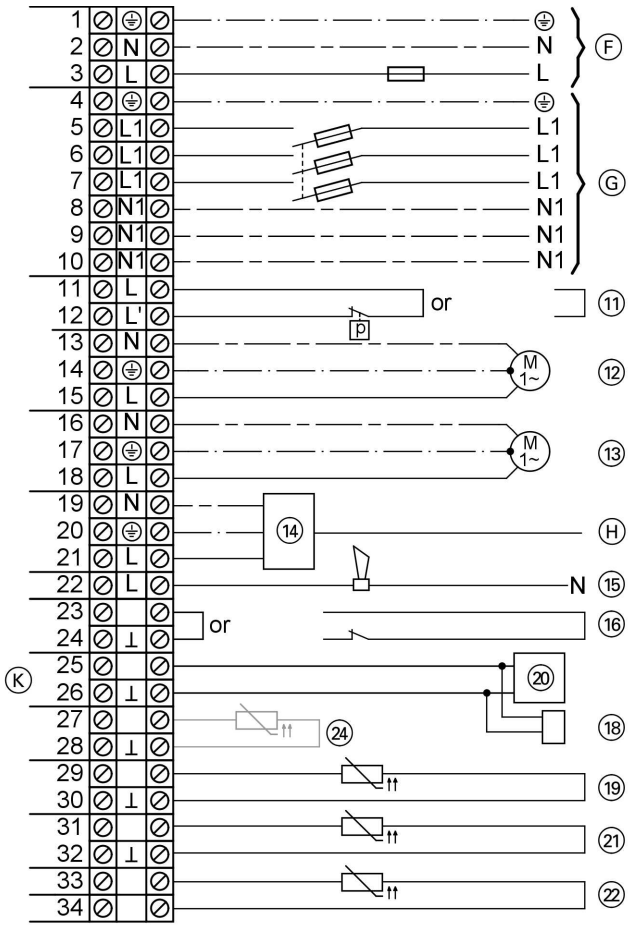
System version 2 (cont.)

Electrical connection (230 V versions)*1

Connections at the main connection area X60



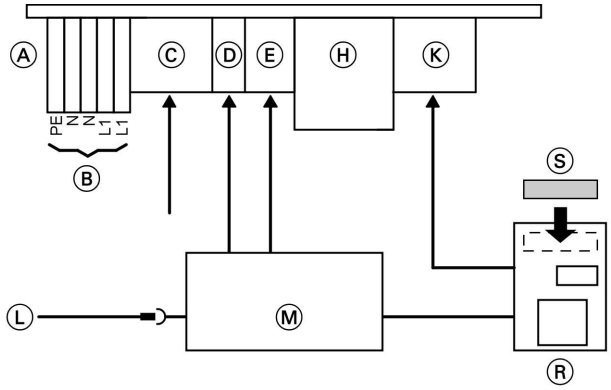
Ⓕ Control unit power supply
Ⓖ Instantaneous heating water heater power cable (circuit breakers **must** be blocked)
Ⓗ External connections at natural cooling extension kit
Ⓚ KM BUS

*1 *Never operate 230 V units in Ⓓ. For more information, see page 14.*

System version 2 (cont.)

⑪ Brine circuit pressure switch (if the pressure switch is **not** installed, **use** the jumper provided)
⑫ Heating circuit pump, direct heating circuit
⑬ DHW circulation pump
⑭ Natural cooling extension kit
⑮ Central fault message
⑯ Power-OFF
⑱ KM BUS: Vitotrol 200 remote control (with room temperature sensor), see also page 67
⑲ Room temperature sensor (if no remote control is installed), see also page 67
⑳ KM BUS: Cooling circuit extension kit
㉑ Outside temperature sensor
㉒ Heating water buffer cylinder temperature sensor
㉔ Collector temperature sensor **(only with Vitocal 242)**

Connections to control module X80, 230 V



Ⓐ Front of control module (with type plate)
Ⓑ Compressor power supply
Ⓒ Internal connection to control panel
Ⓓ Primary pump connection
Ⓔ Compressor safety chain connection
Ⓗ Compressor contactor
Ⓚ Full wave soft starter connection
Ⓛ Primary temperature sensor (for control purposes)
Ⓜ Heat pump module
Ⓡ Full wave soft starter
Ⓢ Capacitor

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System version 2 (cont.)

Information regarding other connections

The primary pump, the secondary pump, the instantaneous heating water heater and the central heating/DHW three-way diverter valve have already been connected in the factory.

Components to be connected	Connection description
Connect capacitor to full wave soft starter	see page 89
Only with natural cooling: Connect the required components to extension kit ⑳ and natural cooling ⑭ extension kit	See separate installation instructions
Only when using an underfloor heating system: Connect temperature limiter	See separate installation instructions

Equipment required for system version 2

Pos.	Description	Number
①	Compact Energy Tower	1
⑥	Diaphragm expansion vessel for the heating circuit	1
⑦	Temperature limiter (only required for the underfloor heating circuit)	1
⑨	Heating water buffer cylinder	1
⑩	Underfloor heating circuit	1
⑫	Heating circuit pump, direct heating circuit	1
⑰	KM BUS distributor	1
⑱	Vitotrol 200 remote control	1
⑲	Room temperature sensor	1
㉒	Cylinder temperature sensor for capturing the temperature inside the heating water buffer cylinder (top)	1
㉘	Heating circuit extension	1
㉙	Connection panel	1
	DHW circulation option	
⑬	DHW circulation pump	1
㉗	DHW circulation extension	1
	Option solar heating circuit (only with Vitocal 242)	
㉓	Solar collectors	as required
㉔	Collector temperature sensor	1
㉕	Diaphragm expansion vessel for the solar circuit	1
㉖	Solar circuit extension	
	Option "Natural cooling" function	
⑧	Vitotrans 100, plate-type heat exchanger	1

System version 2 (cont.)

Pos.	Description	Number
⑭	Natural cooling extension kit	1
⑳	Extension kit for cooling circuit with mixer	1
㉚	Natural cooling contact humidistat	1
㉜	Three-way diverter valve heating/cooling	1
㉝	Motorised two-way ball valve (for the brine circuit)	1
㉞	Frost stat	1
㉟	Circulation pump (primary cooling circuit pump)	1
㊶	Cooling circuit flow temperature sensor	1
㊷	Cooling circuit mixer motor	1

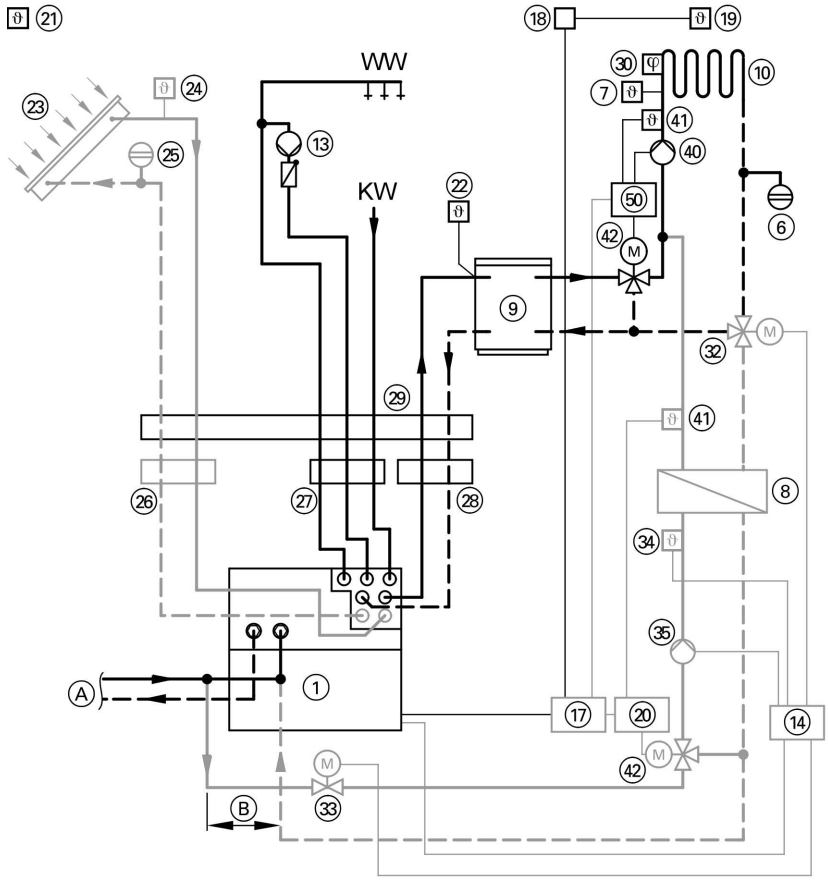
System version 3

One mixer circuit with heating water buffer cylinder, DHW heating with solar boost (option) and natural cooling function (option)

Note
Solar boosted *DHW heating is only possible with the* ***Vitocal 242****.*
To achieve this system version, select ***system design 4*** *at the control unit.*

System version 3 (cont.)

Hydraulic diagram



Ⓐ Primary side interface (see from page 18)
Ⓑ Min. 500 mm (for hydraulic separation)
① Compact Energy Tower
⑥ Diaphragm expansion vessel heating circuit
⑦ Underfloor heating circuit temperature limiter
⑧ Plate-type heat exchanger
⑨ Heating water buffer cylinder
⑩ Underfloor heating circuit
⑬ DHW circulation pump
⑭ Natural cooling extension kit
⑰ KM BUS distributor
⑱ Vitotrol 200 remote control
⑲ Room temperature sensor

System version 3 (cont.)

⑳ Extension kit for cooling circuit with mixer
㉑ Outside temperature sensor
㉒ Heating water buffer cylinder temperature sensor
㉗ DHW circulation extension
㉘ Heating circuit extension
㉙ Connection panel
㉚ Contact humidistat
㉜ Three-way diverter valve heating/cooling
㉝ 2-way motorised ball valve
㉞ Frost stat
㉟ Circulation pump (primary cooling circuit pump)
㊵ Heating circuit pump, mixer circuit
㊶ Flow temperature sensor, mixer circuit
㊷ Three-way mixer - mixer motor
㊿ Extension kit for one heating circuit with mixer

Only in conjunction with Vitocal 242:

㉓ Solar collector
㉔ Collector temperature sensor
㉕ Diaphragm expansion vessel, solar circuit
㉖ Solar circuit extension

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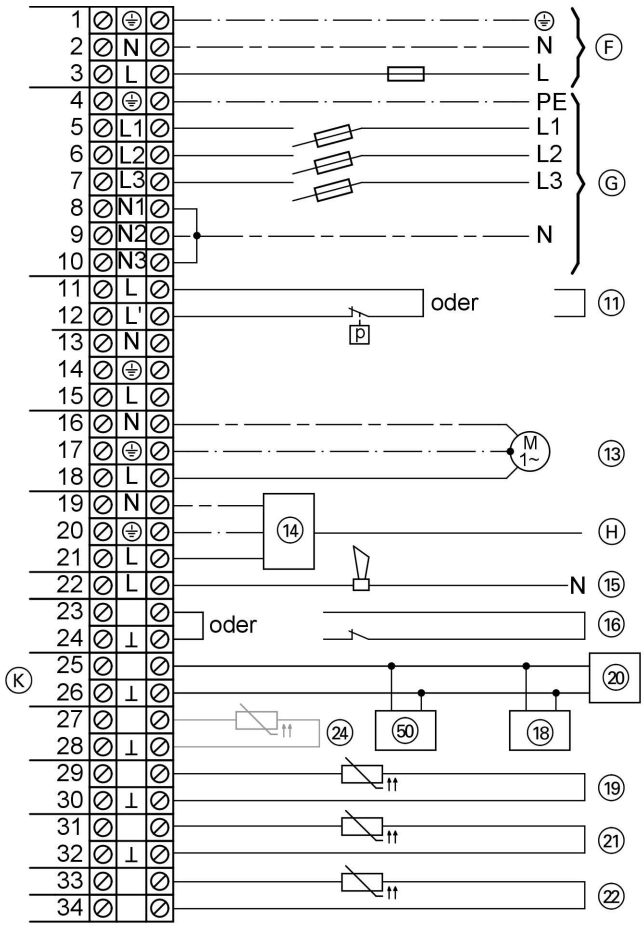
System version 3 (cont.)

Electrical connection (400 V versions)

Connections at the main connection area X60

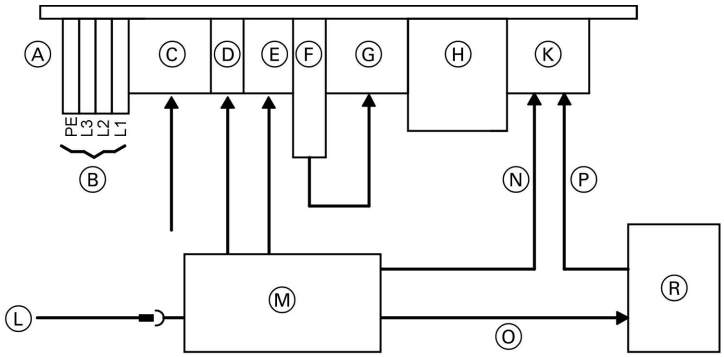


Ⓕ Control unit power connection (230 V)
Ⓖ Instantaneous heating water heater power cable
Ⓗ External connections at natural cooling extension kit
Ⓚ KM BUS
⑪ Brine circuit pressure switch (if the pressure switch is **not** installed, **use** the jumper provided)
⑬ DHW circulation pump

System version 3 (cont.)

⑭ Natural cooling extension kit
⑮ Central fault message (230 V)
⑯ Power-OFF
⑱ KM BUS: Vitotrol 200 remote control (with room temperature sensor), see also page 67
⑲ Room temperature sensor (if no remote control is installed), see also page 67
⑳ KM BUS: Cooling circuit extension kit
㉑ Outside temperature sensor
㉒ Heating water buffer cylinder temperature sensor
㉔ Collector temperature sensor **(only with Vitocal 242)**
㊿ Extension kit for one heating circuit with mixer

Connections to control module X80, 400 V



Ⓐ Front of control module (with type plate)
Ⓑ Compressor power supply
Ⓒ Internal connection to control panel
Ⓓ Primary pump connection (230 V)
Ⓔ Compressor safety chain connection
Ⓕ Phase monitor
Ⓖ Phase monitor connection
Ⓗ Compressor contactor
Ⓚ Compressor or full wave soft starter connection
Ⓛ Primary temperature sensor (for control purposes)
Ⓜ Heat pump module
Ⓝ Direct connection only with BWT 106
Ⓞ Connection required as of BWT 108
Ⓟ Connection required as of BWT 108
Ⓡ Full wave soft starter (as of BWT 108)

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System version 3 (cont.)

Information regarding other connections

The primary pump, the secondary pump, the instantaneous heating water heater and the central heating/DHW three-way diverter valve have already been connected in the factory.

Components to be connected	Connection description
Connect components for heating circuit with mixer to extension kit ⑤⓪	See separate installation instructions
Only with natural cooling: Connect the required components to extension kit ②⓪ and natural cooling ①④ extension kit	See separate installation instructions
Only when using an underfloor heating system: Connect temperature limiter	See separate installation instructions

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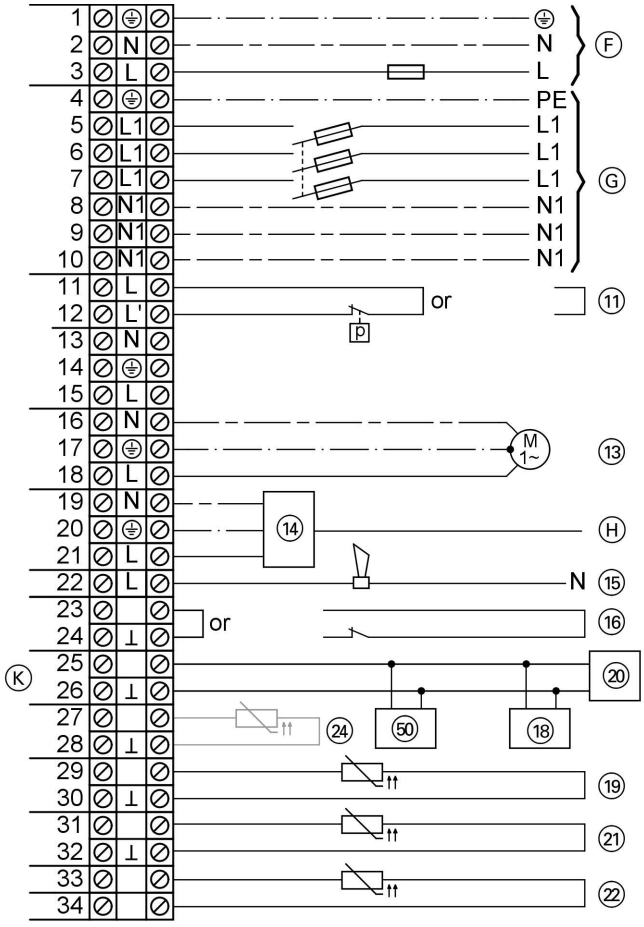
System version 3 (cont.)

Electrical connection (230 V versions)*1

Connections at the main connection area X60



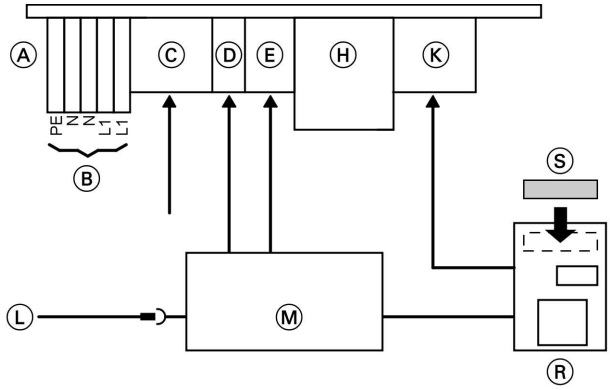
Ⓕ Control unit power supply
Ⓖ Instantaneous heating water heater power cable (circuit breakers **must** be blocked)
Ⓗ External connections at natural cooling extension kit
Ⓚ KM BUS

*1 *Never operate 230 V units in Ⓓ. For more information, see page 14.*

System version 3 (cont.)

⑪ Brine circuit pressure switch (if the pressure switch is **not** installed, **use** the jumper provided)
⑬ DHW circulation pump
⑭ Natural cooling extension kit
⑮ Central fault message
⑯ Power-OFF
⑱ KM BUS: Vitotrol 200 remote control (with room temperature sensor), see also page 67
⑲ Room temperature sensor (if no remote control is installed), see also page 67
⑳ KM BUS: Cooling circuit extension kit
㉑ Outside temperature sensor
㉒ Heating water buffer cylinder temperature sensor
㉔ Collector temperature sensor **(only with Vitocal 242)**
㊿ Extension kit for one heating circuit with mixer

Connections to control module X80, 230 V



Ⓐ Front of control module (with type plate)
Ⓑ Compressor power supply
Ⓒ Internal connection to control panel
Ⓓ Primary pump connection
Ⓔ Compressor safety chain connection
Ⓗ Compressor contactor
Ⓚ Full wave soft starter connection
Ⓛ Primary temperature sensor (for control purposes)
Ⓜ Heat pump module
Ⓡ Full wave soft starter
Ⓢ Capacitor

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System version 3 (cont.)

Information regarding other connections

The primary pump, the secondary pump, the instantaneous heating water heater and the central heating/DHW three-way diverter valve have already been connected in the factory.

Components to be connected	Connection description
Connect components for heating circuit with mixer to extension kit ⑤⓪	See separate installation instructions
Connect capacitor to full wave soft starter	see page 89
Only with natural cooling: Connect the required components to extension kit ②⓪ and natural cooling ①④ extension kit	See separate installation instructions
Only when using an underfloor heating system: Connect temperature limiter	See separate installation instructions

Equipment required for system version 3

Pos.	Description	Number
①	Compact Energy Tower	1
⑥	Diaphragm expansion vessel for the heating circuit	1
⑦	Temperature limiter (only required for the underfloor heating circuit)	1
⑨	Heating water buffer cylinder	1
⑩	Underfloor heating circuit	
⑰	KM BUS distributor	1
⑱	Vitotrol 200 remote control	1
⑲	Room temperature sensor	1
㉒	Cylinder temperature sensor for capturing the temperature inside the heating water buffer cylinder (top)	1
㉘	Heating circuit extension	1
㉙	Connection panel	1
㊵	Heating circuit pump, mixer circuit	1
㊶	Flow temperature sensor, mixer circuit	1
㊷	Three-way mixer - mixer motor	1
⑤⓪	Extension kit for one heating circuit with mixer	1
	DHW circulation option	
⑬	DHW circulation pump	1
㉗	DHW circulation extension	1
	Option solar heating circuit (only with Vitocal 242)	

System version 3 (cont.)

Pos.	Description	Number
㉓	Solar collectors	as required
㉔	Collector temperature sensor	1
㉕	Diaphragm expansion vessel for the solar circuit	1
㉖	Solar circuit extension	
	Option "Natural cooling" function	
⑧	Vitotrans 100, plate-type heat exchanger	1
⑭	Natural cooling extension kit	1
⑳	Extension kit for cooling circuit with mixer	1
㉚	Natural cooling contact humidistat	1
㉜	3-way diverter valve	1
㉝	Motorised two-way ball valve (for the brine circuit)	1
㉞	Frost stat	1
㉟	Circulation pump (primary cooling circuit pump)	1
㊶	Flow temperature sensor, mixer circuit	1
㊷	Three-way mixer - mixer motor	1

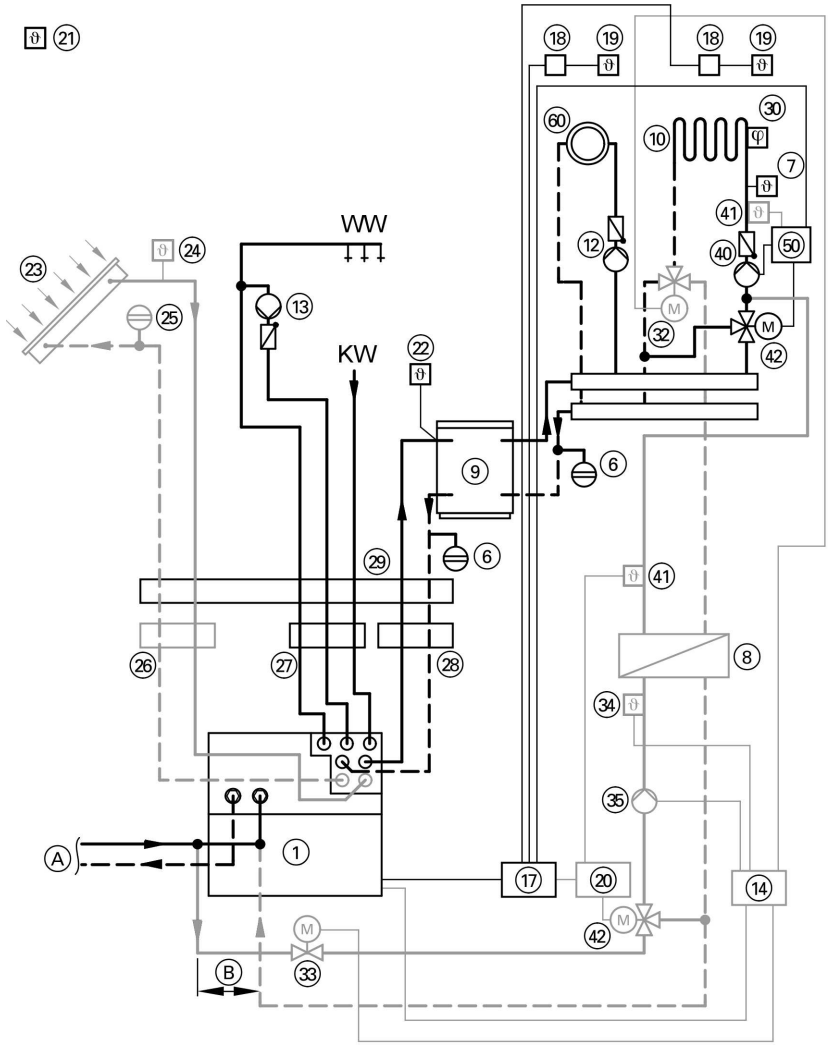
System version 4

One directly connected heating circuit, one mixer circuit, heating water buffer cylinder, DHW heating with solar boost (option) and natural cooling function (option)

Note
Solar boosted *DHW heating is only possible with the* ***Vitocal 242****.*
To achieve this system version, select ***system design 6*** *at the control unit.*

System version 4 (cont.)

Hydraulic diagram



Ⓐ Primary side interface (see from page 18)
Ⓑ Min. 500 mm (for hydraulic separation)
① Compact Energy Tower
⑥ Diaphragm expansion vessel heating circuit

System version 4 (cont.)

⑦ Underfloor heating circuit temperature limiter
⑧ Plate-type heat exchanger
⑨ Heating water buffer cylinder
⑩ Underfloor heating circuit
⑫ Heating circuit pump, direct heating circuit
⑬ DHW circulation pump
⑭ Natural cooling extension kit
⑰ KM BUS distributor
⑱ Vitotrol 200 remote control
⑲ Room temperature sensor
⑳ Extension kit for cooling circuit with mixer
㉑ Outside temperature sensor
㉒ Heating water buffer cylinder temperature sensor
㉗ DHW circulation extension
㉘ Heating circuit extension
㉙ Connection panel
㉚ Contact humidistat
㉜ Three-way diverter valve heating/cooling
㉝ 2-way motorised ball valve
㉞ Frost stat
㉟ Circulation pump (primary cooling circuit pump)
㊵ Heating circuit pump, mixer circuit
㊶ Flow temperature sensor, mixer circuit
㊷ Three-way mixer - mixer motor
㊿ Extension kit for one heating circuit with mixer
60 Radiator heating circuit

Only in conjunction with Vitocal 242:
㉓ Solar collector
㉔ Collector temperature sensor
㉕ Diaphragm expansion vessel, solar circuit
㉖ Solar circuit extension

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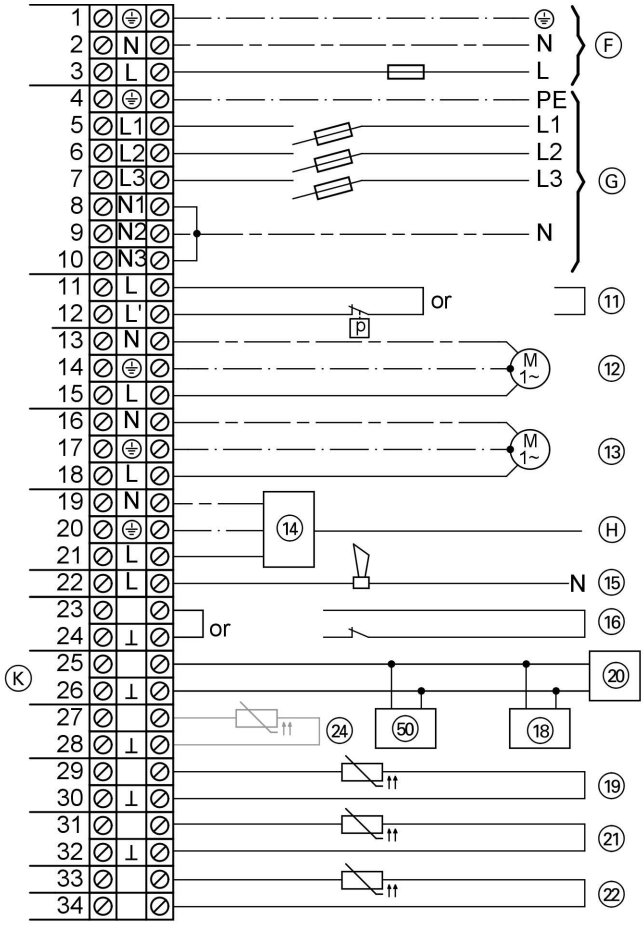
System version 4 (cont.)

Electrical connection (400 V versions)

Connections at the main connection area X60



Ⓕ Control unit power connection (230 V)
Ⓖ Instantaneous heating water heater power cable
Ⓗ External connections at natural cooling extension kit
Ⓚ KM BUS
⑪ Brine circuit pressure switch (if the pressure switch is **not** installed, **use** the jumper provided)

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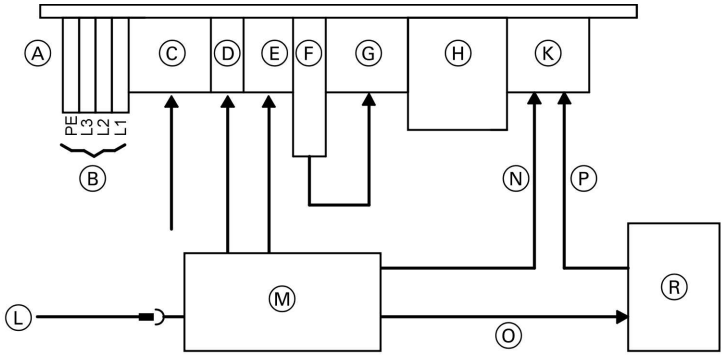
System version 4 (cont.)

⑫ Heating circuit pump, direct heating circuit
⑬ DHW circulation pump
⑭ Natural cooling extension kit
⑮ Central fault message (230 V)
⑯ Power-OFF
⑱ KM BUS: Vitotrol 200 remote control (with room temperature sensor), see also page 67
⑲ Room temperature sensor (if no remote control is installed), see also page 67
⑳ KM BUS: Cooling circuit extension kit
㉑ Outside temperature sensor
㉒ Heating water buffer cylinder temperature sensor
㉔ Collector temperature sensor **(only with Vitocal 242)**
㊿ KM BUS: Extension kit for one heating circuit with mixer

Connections to control module X80, 400 V



Ⓐ Front of control module (with type plate)
Ⓑ Compressor power supply
Ⓒ Internal connection to control panel
Ⓓ Primary pump connection (230 V)
Ⓔ Compressor safety chain connection
Ⓕ Phase monitor
Ⓖ Phase monitor connection
Ⓗ Compressor contactor
Ⓚ Compressor or full wave soft starter connection
Ⓛ Primary temperature sensor (for control purposes)
Ⓜ Heat pump module
Ⓝ Direct connection only with BWT 106
Ⓞ Connection required as of BWT 108
Ⓟ Connection required as of BWT 108
Ⓡ Full wave soft starter (as of BWT 108)

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System version 4 (cont.)

Information regarding other connections

The primary pump, the secondary pump, the instantaneous heating water heater and the central heating/DHW three-way diverter valve have already been connected in the factory.

Components to be connected	Connection description
Connect components for heating circuit with mixer to extension kit (50)	See separate installation instructions
Only with natural cooling: Connect the required components to extension kit (20) and natural cooling (14) extension kit	See separate installation instructions
Only when using an underfloor heating system: Connect temperature limiter	See separate installation instructions

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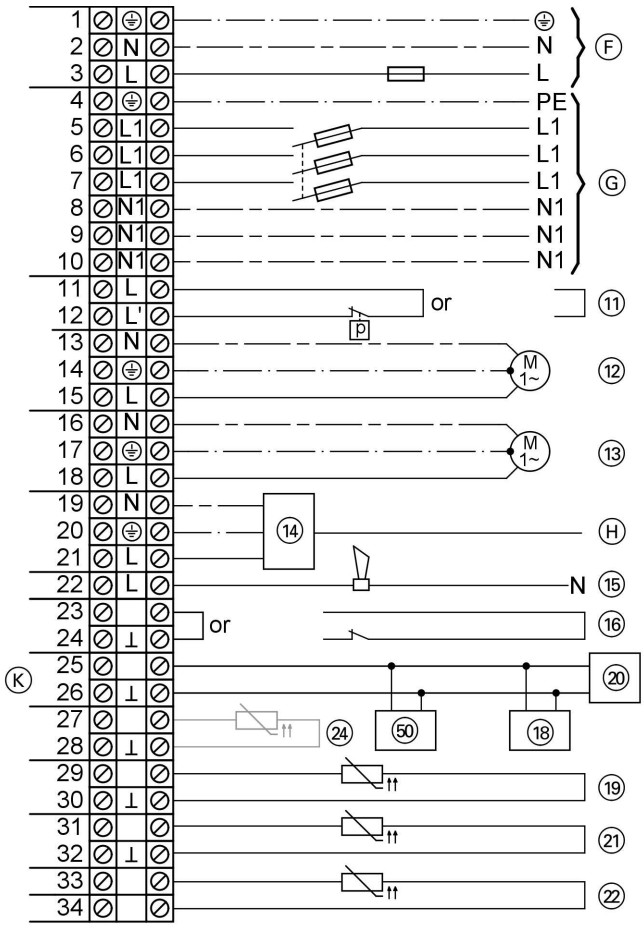
System version 4 (cont.)

Electrical connection (230 V versions)*1

Connections at the main connection area X60



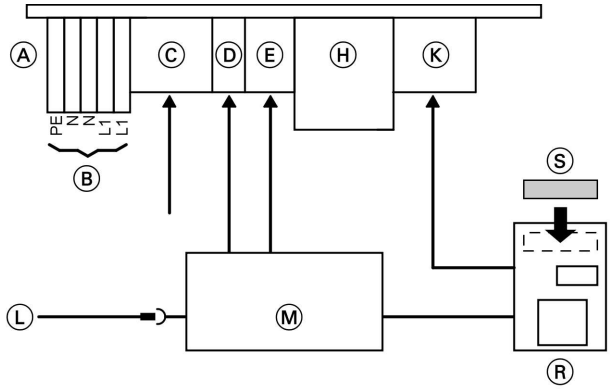
Ⓕ Control unit power supply
Ⓖ Instantaneous heating water heater power cable (circuit breakers **must** be blocked)
Ⓗ External connections at natural cooling extension kit
Ⓚ KM BUS

*1 *Never operate 230 V units in Ⓓ. For more information, see page 14.*

System version 4 (cont.)

⑪ Brine circuit pressure switch (if the pressure switch is **not** installed, **use** the jumper provided)
⑫ Heating circuit pump, direct heating circuit
⑬ DHW circulation pump
⑭ Natural cooling extension kit
⑮ Central fault message
⑯ Power-OFF
⑱ KM BUS: Vitotrol 200 remote control (with room temperature sensor), see also page 67
⑲ Room temperature sensor (if no remote control is installed), see also page 67
⑳ KM BUS: Cooling circuit extension kit
㉑ Outside temperature sensor
㉒ Heating water buffer cylinder temperature sensor
㉔ Collector temperature sensor **(only with Vitocal 242)**
㊿ KM BUS: Extension kit for one heating circuit with mixer

Connections to control module X80, 230 V



Ⓐ Front of control module (with type plate)
Ⓑ Compressor power supply
Ⓒ Internal connection to control panel
Ⓓ Primary pump connection
Ⓔ Compressor safety chain connection
Ⓗ Compressor contactor
Ⓚ Full wave soft starter connection
Ⓛ Primary temperature sensor (for control purposes)
Ⓜ Heat pump module
Ⓡ Full wave soft starter
Ⓢ Capacitor

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System version 4 (cont.)

Information regarding other connections

The primary pump, the secondary pump, the instantaneous heating water heater and the central heating/DHW three-way diverter valve have already been connected in the factory.

Components to be connected	Connection description
Connect components for heating circuit with mixer to extension kit ⑤⓪	See separate installation instructions
Connect capacitor to full wave soft starter	see page 89
Only with natural cooling: Connect the required components to extension kit ②⓪ and natural cooling ①④ extension kit	See separate installation instructions
Only when using an underfloor heating system: Connect temperature limiter	See separate installation instructions

Equipment required for system version 4

Pos.	Description	Number
①	Compact Energy Tower	1
⑥	Diaphragm expansion vessel for the heating circuit	1
⑦	Temperature limiter (only required for the underfloor heating circuit)	1
⑨	Heating water buffer cylinder	1
⑩	Underfloor heating circuit	1
⑫	Heating circuit pump, direct heating circuit	1
⑰	KM BUS distributor	1
⑱	Vitotrol 200 remote control	2
⑲	Room temperature sensor	2
②②	Cylinder temperature sensor for capturing the temperature inside the heating water buffer cylinder (top)	1
②⑧	Heating circuit extension	1
②⑨	Connection panel	1
④⓪	Heating circuit pump, mixer circuit	1
④①	Flow temperature sensor, mixer circuit	1
④②	Three-way mixer - mixer motor	1
⑤⓪	Extension kit for one heating circuit with mixer	1
⑥⓪	Radiator heating circuit	1
	DHW circulation option	
⑬	DHW circulation pump	1

System version 4 (cont.)

Pos.	Description	Number
㉗	DHW circulation extension	1
	Option solar heating circuit (only with Vitocal 242)	
㉓	Solar collectors	as required
㉔	Collector temperature sensor	1
㉕	Diaphragm expansion vessel for the solar circuit	1
㉖	Solar circuit extension	1
	Option "Natural cooling" function	
⑧	Vitotrans 100, plate-type heat exchanger	1
⑭	Natural cooling extension kit	1
⑳	Extension kit for cooling circuit with mixer	1
㉚	Natural cooling contact humidistat	1
㉜	Three-way diverter valve heating/cooling	1
㉝	Motorised two-way ball valve (for the brine circuit)	1
㉞	Frost stat	1
㉟	Circulation pump (primary cooling circuit pump)	1
㊶	Flow temperature sensor, mixer circuit	1
㊷	Three-way mixer - mixer motor	1

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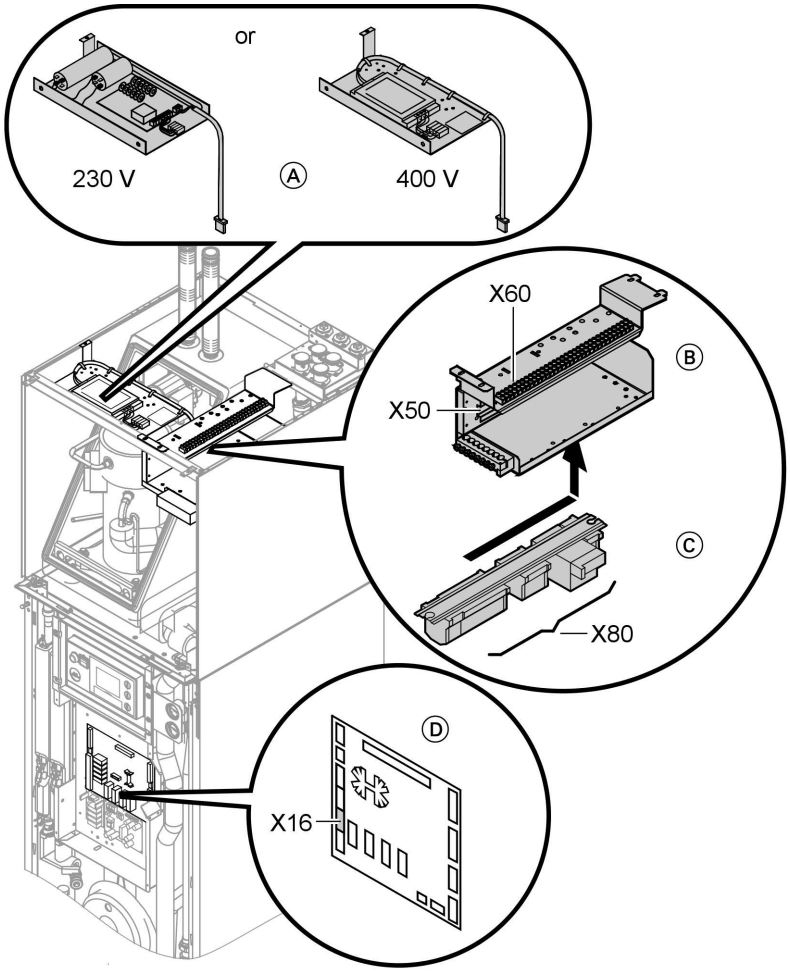
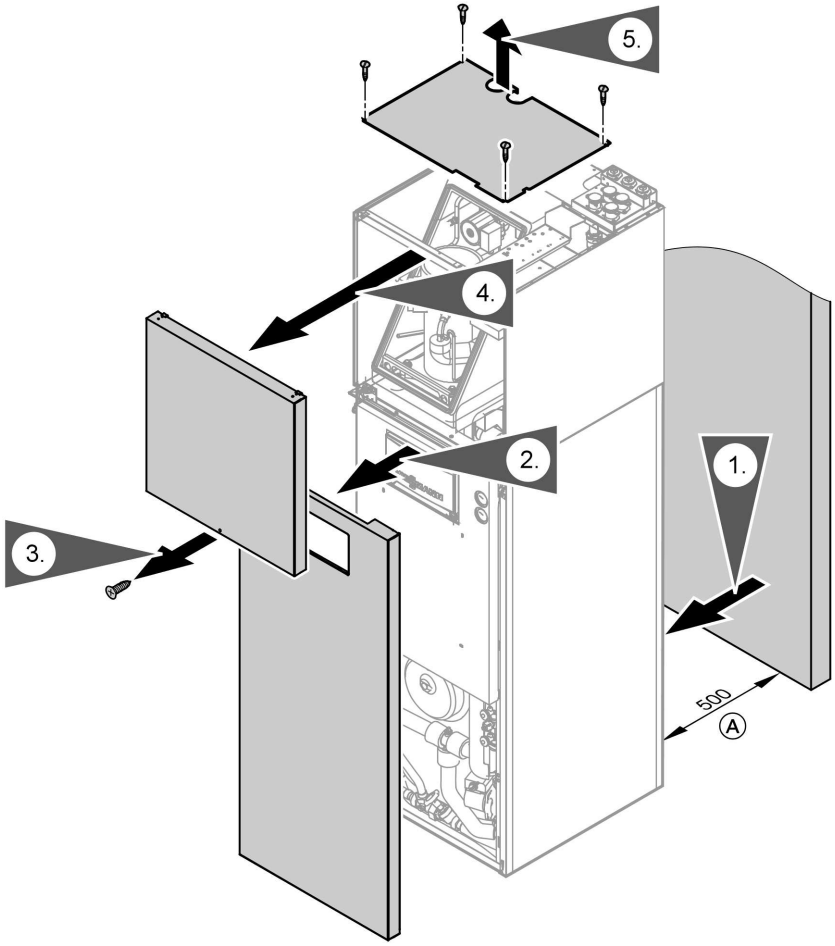
Summary of electrical connections

The following table provides an overview of all electrical connecting areas.



Ⓐ Full wave soft starter, 400 V or 230 V version
Ⓑ Junction box with X60 main connecting area and X50 additional internal connecting area
Ⓒ Control module with X80 connecting area
Ⓓ Main PCB with X16 connecting area

Preparing the installation



Ⓐ Clearance from the wall or front edge of the recess.

Note
Position the back of the unit ***temporarily*** *approx. 500 mm from the on-site drain connection.*

1. Pull the front panel at its upper edge forward and lift out upwards.

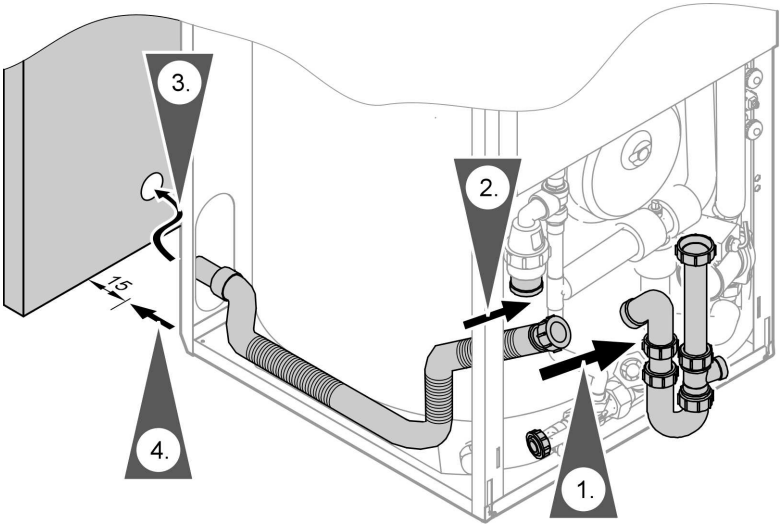
2. Undo the screw at the bottom edge of the front panel.

Preparing the installation (cont.)

3. Pull the upper front panel at its lower edge forward and lift out upwards.

4. Release the front top panel.

Fitting the water drain (Vitocal 242)



Note
To prevent damage to the connecting cables with wall clearances of > 80 mm, the connecting cables must be provided with strain relief on site.

1. Release the siphon.

2. Release the drain hose from the siphon and stretch (pull forward out of the equipment).

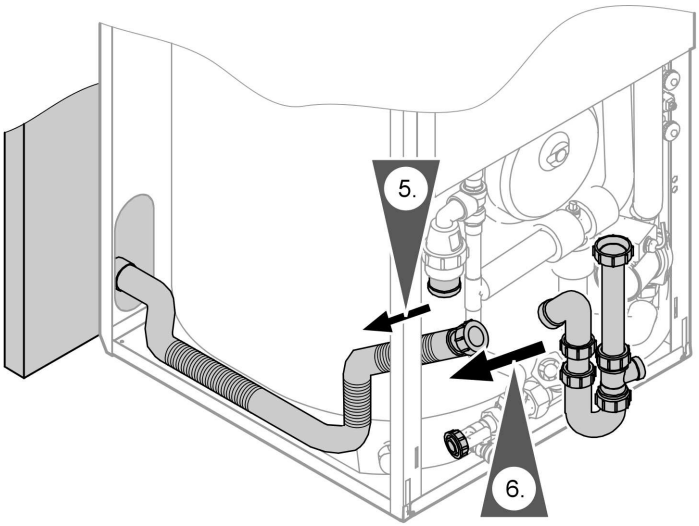
3. ***Note***
*Check the drain connection for leaks **before** settling the equipment in its final position and filling the DHW cylinder.*

Connect the drain hose with the on-site drain connection DN 32.

Fitting the water drain (Vitocal 242) (cont.)

4. ***Note***
Min. clearance between the wall and the back of the equipment when the drain connection is located behind the equipment: 15 mm, and when the drain connection is located adjacent to the equipment: 45 mm.

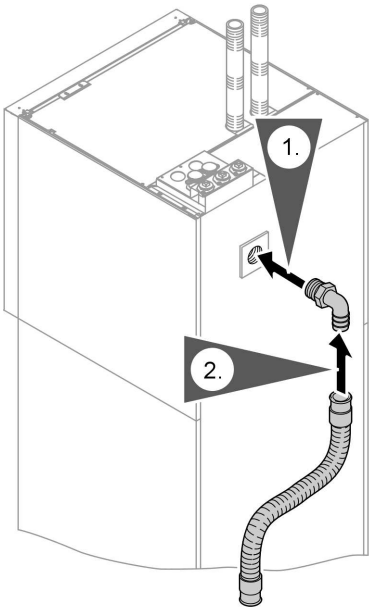
Push the compact unit against the wall or into the recess.



5. Compress the drain hose that is hanging out of the front of the equipment and connect it to the siphon.

6. Install the siphon.

Fitting the water drain (Vitocal 222)



Note
To prevent damage to the connecting cables with wall clearances of > 80 mm, the connecting cables must be provided with strain relief on site.

1. Fit the threaded ferrule at the back of the equipment
2. Push the drain hose onto the threaded ferrule and secure with a hose clip.
3. Connect the drain outlet kit with the on-site drain connection DN 40.

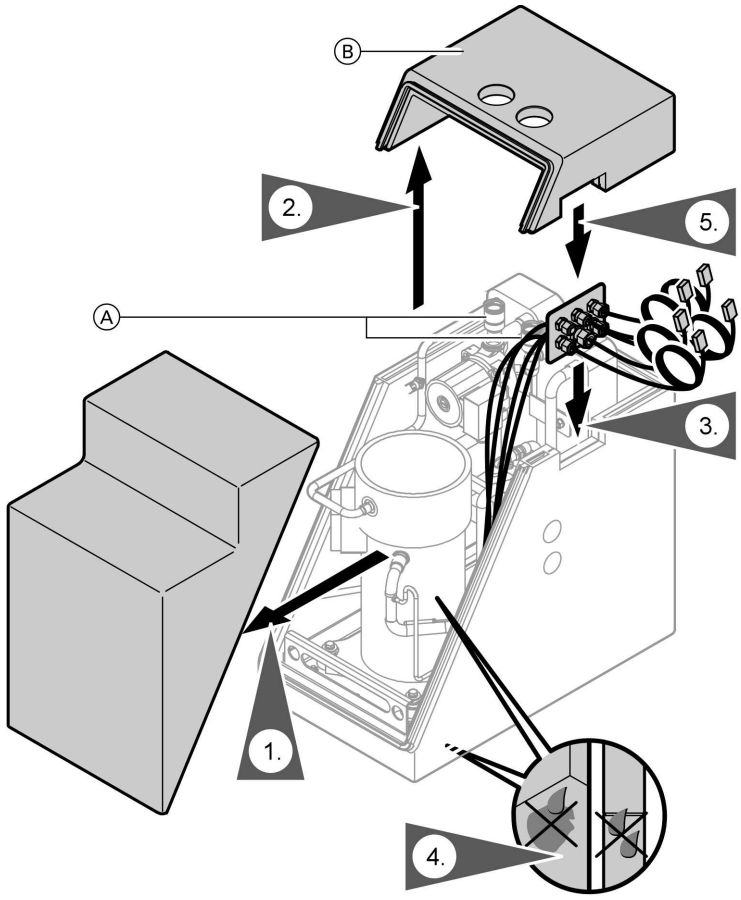
   Installation instructions; drain outlet kit
4. Push the drain hose into the drain outlet kit.
5. ***Note***
   Min. clearance between the wall and the back of the device 45 mm.

   Push the compact unit against the wall or into the recess.

Heat pump preparation

! **Please note**
If the compressor is at a steep angle in the heat pump module, the introduction of lubricant into the refrigerant circuit will damage the equipment. The heat pump module must not be tilted by more than 30° during transportation.

Heat pump preparation (cont.)



1. Remove the front part of the thermal insulation.

2. Remove the top part of the thermal insulation.

3. Insert the strain relief with inserted cables (lying at the bottom of the thermal insulation) into the groove of the recess in the lower part of the thermal insulation.

4. Check the floor area, valves and all visible solder joints of the heat pump for traces of oil.

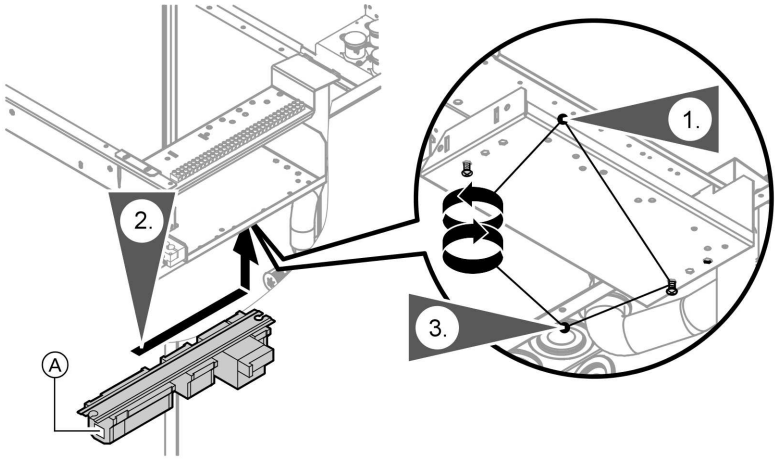
Note
Traces of oil indicate a leaking refrigerant circuit. Ask a refrigeration engineer to check the heat pump.

Heat pump preparation (cont.)

5. Lead the thermal insulation Ⓐ of the primary inlets and outlets through the openings in the top part of the thermal insulation Ⓑ. Position the top part of the thermal insulation.

Note
Do not push the thermal insulation together when doing this.

Installing the control module



Ⓐ Type plate

1. Undo 2 pre-installed screws on the underside of the control panel, but do **not** unscrew.

Installing the control module (cont.)

2. Suspend control module (with type plate at the front) over the undone screws.

   Note
   If the control module cannot be fitted without touching internal components, the 2 screws must be relocated in one of the two additional holes.

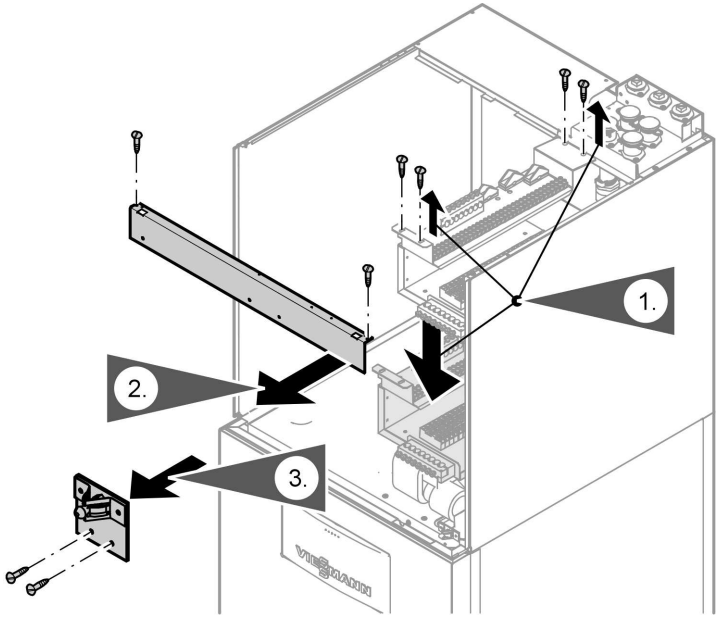
3. Tighten the screws.

4. Fit the control panel connecting cable (7-pin) to pos. Ⓒ at the control unit (see page 22).

   Note
   The plug must click home.

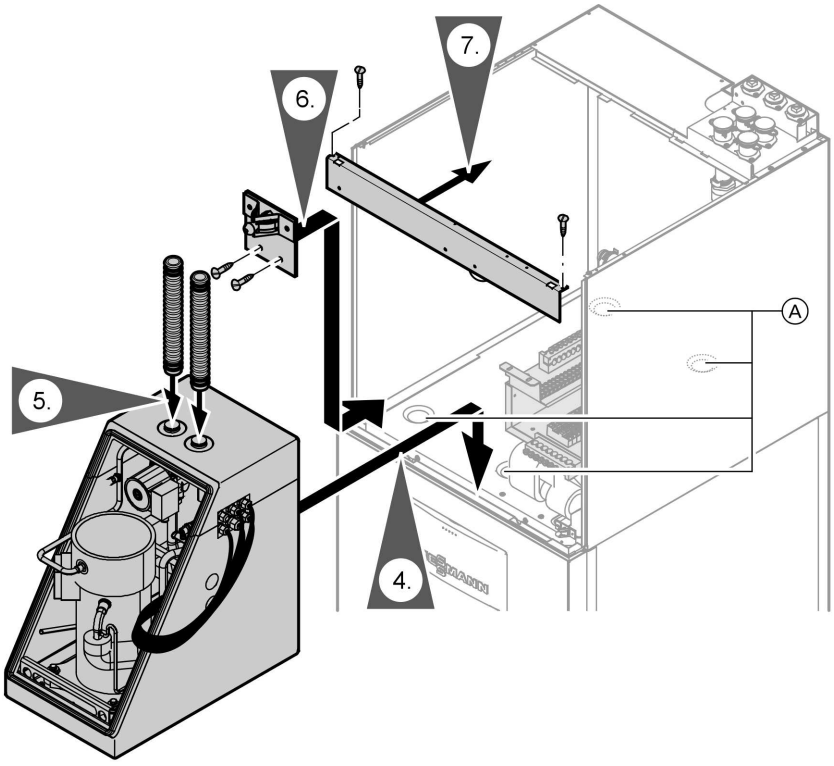
Inserting the heat pump

! **Please note**
If the compressor is at a steep angle in the heat pump module, the introduction of lubricant into the refrigerant circuit will damage the equipment. The heat pump module must not be tilted more than 30° during installation.



Inserting the heat pump (cont.)

1. Remove the control panel and put it on top of the heat exchanger.
2. Remove the crossbar.
3. Lift the edge protector and remove the l.h. retaining panel with special stud.



4. ***Note***
   Position the heat pump feet in the four indentations Ⓐ provided for this purpose in the intermediate panel.

   Lift the heat pump without the front part of the thermal insulation into the compact unit.

Inserting the heat pump (cont.)

5. ***Note***
   Observe information regarding the brine connection on page 98.

   Insert the corrugated pipes of the connection set for the brine circuit (supplied with the heat pump) into the pipe sleeves of the heat pump and **secure** them with the clips supplied.

   Note
   *Do **not shorten** the corrugated pipes. It will **not be possible to seal** the connector at the shortened end of the corrugated pipe.*

   Installation information brine circuit connection set

6. Fit the l.h. retaining panel with the special stud.

7. Fit the crossbar.

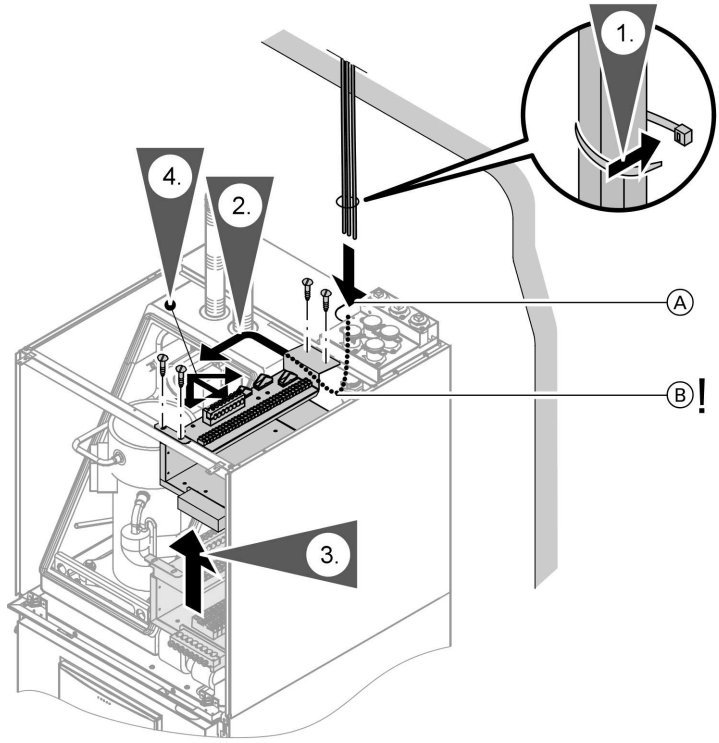
8. Level the unit.

Inserting the cables

When routing the on-site connecting cables, observe the position of the cable entries into the equipment (in the equipment lid, see page 10 and the following figure) as well as the recommended positions of the outlet areas for the hydraulic and brine connections (see page 98).

Allow for a cable length of **1300 mm inside** the device (from the cable entry to the electrical terminal array) for connecting on-site cables **inside** the device.

Inserting the cables (cont.)



1. ! **Please note**
Damaged cable insulation can cause damage to the unit.
Route cables so that they cannot touch very hot, vibrating or sharp-edged components.

Route external cables to the rear upper edge of the unit and cut to length, leaving approx. 1300 mm of cable **in the unit**.
Route low voltage cables and 230/400 V cables separately and bundle separately using cable ties.

2. ! **Please note**
Condensate in the control panel can damage the equipment.
Route the cable harness as described in the following steps (with a bend so that condensate can drip off).

Run the cables through aperture Ⓐ. Immediately after the point where they enter the unit, make a **bend** Ⓑ in the cables that hangs **downwards** and fix in position with cable ties.

Inserting the cables (cont.)

3. Fit the control panel.

4. Make all external electrical connections in accordance with the instructions starting on page 66.

Connecting the external electrical components

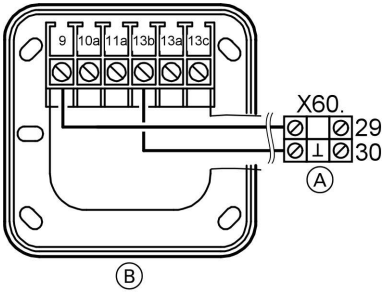
Note
The unit's external electrical connections are located together in the control panel in the top right-hand area of the unit (see Ⓑ on page 55).

Sensor connections

With the exception of the outside temperature sensor, we recommend the use of screened cable (e.g. J-Y(St)Y, 2 x 0.8 mm, max. 10 m long).

Note
Never run LV cables immediately next to 230/400 V cables.
For cable runs > 10 m use a larger cross-section or terminate several cores together.

Room temperature sensor (type Ni 500)



Room temperature sensor installation instructions

Note
Release snap fasteners to open room temperature sensor.

Ⓐ Terminals in the control panel
Ⓑ Room temperature sensor enclosure

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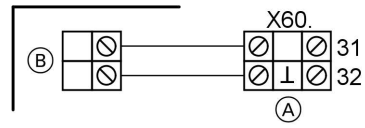
Connecting the external electrical components (cont.)

Information regarding the use of room temperature sensors and remote controls

- If a room temperature sensor is being installed for a heating circuit without a remote control, the room temperature sensor must be connected as shown in the illustration above.
- If a remote control has been connected for a heating circuit, the room temperature sensor for this heating circuit must be connected to the remote control.
- If 2 remote controls have been connected, connection X60.29/X60.30 on the control panel will be disabled.
- Both the remote control units and the room temperature sensors must be activated independently (see control settings, pages 172 and 175).

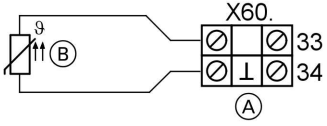
Outside temperature sensor (type Ni 500)



Install the outside temperature sensor on the north or north-west wall at a height of approx. 2.5 m; never render it over.
Lead: 2 x 1.5 mm^2, max. 35 m long, copper.
Cores are interchangeable.

Ⓐ Terminals in the control panel
Ⓑ Terminals at the outside temperature sensor

Temperature sensor (type Pt 500) in the heating water buffer cylinder

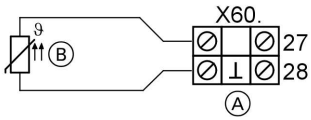


Earth can also be connected to terminals X60.28 or X60.30.

Ⓐ Terminals in the control panel
Ⓑ Buffer cylinder sensor

Connecting the external electrical components (cont.)

Collector temperature sensor (type Pt 500, only for the Vitocal 242)

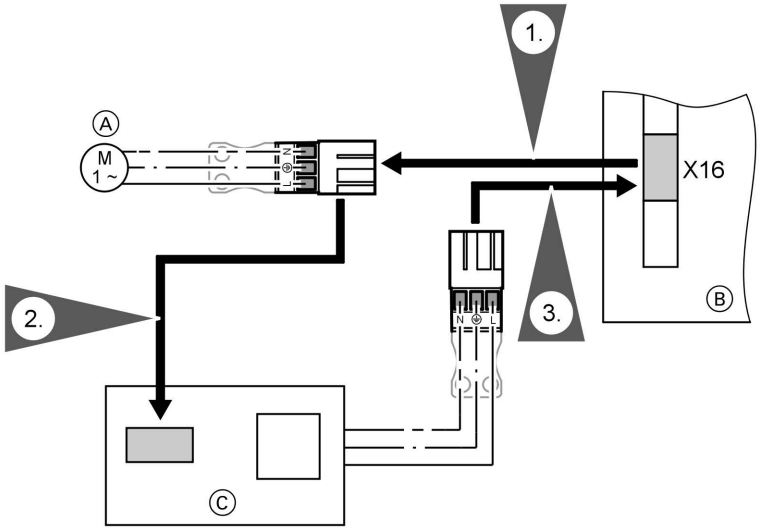


Solar collector installation instructions

Ⓐ Terminals in the control panel
Ⓑ Collector temperature sensor

Connect temperature limiter to underfloor heating system

When using the integral secondary circuit pump as a heating circuit pump



1. Pull plug or integral secondary circuit pump Ⓐ from X16 of main PCB Ⓑ (for location of main PCB, see page 55).

2. Plug connector of built-in secondary circuit pump into socket on temperature limiter Ⓒ.

3. Push plug of temperature limiter onto X16 on main PCB Ⓑ.

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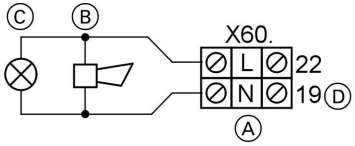
Connecting the external electrical components (cont.)

When using a separate heating circuit pump

Temperature limiter installation instructions

Central fault message

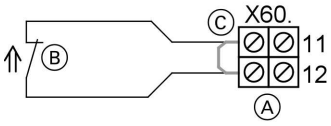


Ⓐ Terminals in the control panel
Ⓑ Acoustic alarm
Ⓒ Optical alarm
Ⓓ Alternatively, the neutral conductor can also be connected across terminals X60.13 or X60.16

Breaking capacity: 230 V~, 0.7 A

Note
*This contact is **not** at zero volt. 230 V~ will be present if there is a fault.*

Pressure switch, brine circuit



Ⓐ Terminals in the control panel
Ⓑ Brine pressure switch
Ⓒ Jumper

If **no** brine pressure switch is connected, **always** connect the jumper (in the pack) downstream of the power supply. Always check the rotating field at the phase monitor prior to inserting the jumper.
The contact must be able to switch at least 230 V and 0.7 A.

Note
Only use components in the external safety chain that do not automatically re-start (reset). Where required, ensure this through a mechanical interlock.

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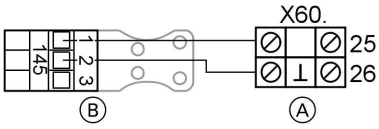
Connecting the external electrical components (cont.)

Extension kit for a mixer circuit and/or Vitotrol 200 remote control (via KM BUS)

Note
General information regarding the room temperature sensors and remote controls, see page 66.

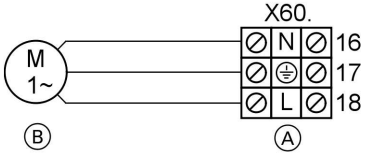


Ⓐ Terminals in the control panel
Ⓑ Connection extension kit or KM BUS distributor

Connection via KM BUS data cable.
Connect the mixer circuit pump to the extension kit.
The connecting plug and cable (3 m long) are supplied with the extension kit. If several subscribers are to be connected to the KM BUS we recommend the use of a KM BUS distributor (accessory).
Cores are interchangeable.

Extension kit installation instructions

DHW circulation pump



Ⓐ Terminals in the control panel
Ⓑ DHW circulation pump

Breaking capacity: 230 V~, 0.7 A

Natural cooling function

The natural cooling function can be implemented with the "NC-Box" or via an on-site installation.

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Connecting the external electrical components (cont.)

Natural cooling with NC-Box

The NC-Box is a fully assembled unit for the implementation of the natural cooling function, subject to version with (part no. 7244 674) or without mixer (part no. 7244 673). It contains all essential pumps, valves and the plate-type heat exchanger.

Power is connected via terminals X60.19 and X60.21 inside the Compact Energy Tower control panel.

Installation instructions NC-Box and technical guide Vitocal 200/222/242

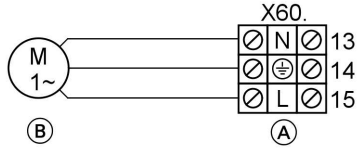
natural cooling with individual components (on-site installation)

For the electrical connection of the individual components (pumps, valves, contact humidity switch etc.), we recommend the use of the natural cooling extension kit (part no. 7179 172)

Power is connected via terminals X60.19 and X60.21 inside the Compact Energy Tower control panel.

Installation instructions, natural cooling extension kit and technical guide Vitocal 200/222/242

Pump of the heating circuit without mixer



Breaking capacity: 230 V~, 0.7 A

Note

*The heating circuit pump **with** mixer is connected to the extension kit (for one heating circuit with mixer).*

Ⓐ Terminals in the control panel
Ⓑ Pump of the heating circuit without mixer

Power-OFF connection (400/230 V)

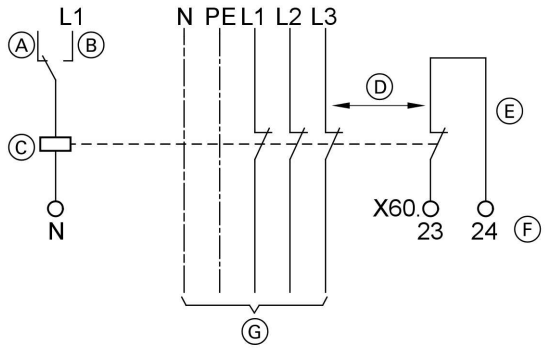
The signal from the power-OFF contact has the following effects:
- Notification to control unit (via junction box terminal strip X60)
- Shutting down the supply voltage of the respective component

Connecting the external electrical components (cont.)

Version 1

"Hard" shut-off of power supply for compressor and/or instantaneous heating water heater and OFF contact to control unit.

Power-OFF with 400 V power connection (version 1)



Ⓐ No power-OFF in this position
Ⓑ Control contact ripple control receiver "power-OFF"
Ⓒ Control of compressor or instantaneous heating water heater
Ⓓ The air and creepage gap must exceed 8 mm, since the control input is a low voltage input
Ⓔ Power-OFF contact for control unit
Ⓕ Terminals in the control panel
Ⓖ Power circuit supply to compressor or instantaneous heating water heater

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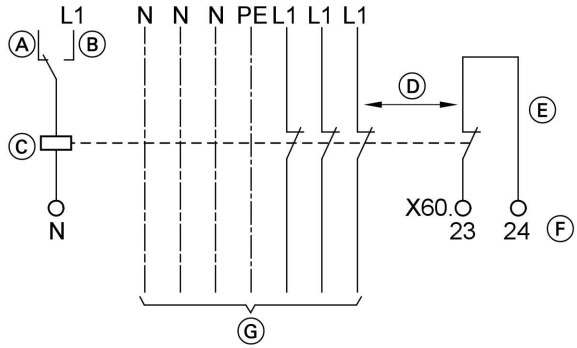
Connecting the external electrical components (cont.)

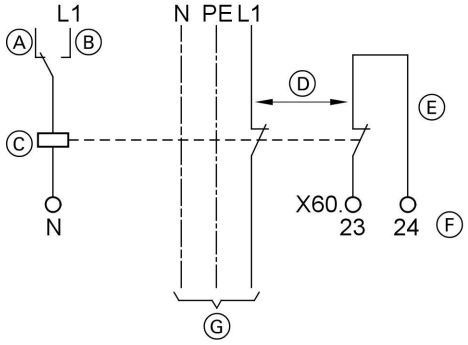
Power-OFF with 230 V power connection (version 1)

Instantaneous heating water heater



Ⓐ No power-OFF in this position
Ⓑ Control contact ripple control receiver "power-OFF"
Ⓒ Contactor (part no. 7814 681)
Ⓓ The air and creepage gap must exceed 8 mm, since the control input is a low voltage input.
Ⓔ Power-OFF contact for control unit
Ⓕ Terminals in the control panel
Ⓖ **Instantaneous heating water heater** (230 V) power supply connection

Compressor



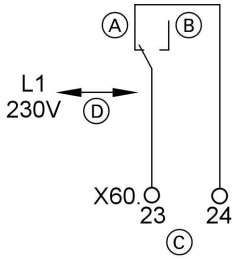
Ⓐ No power-OFF in this position

Connecting the external electrical components (cont.)

Ⓑ Control contact ripple control receiver "power-OFF"
Ⓒ Contactor
Ⓓ The air and creepage gap must exceed 8 mm, since the control input is a low voltage input
Ⓔ Power-OFF contact for control unit
Ⓕ Terminals in the control panel
Ⓖ **Compressor** (230 V) power supply connection

Version 2 (400/230 V)

If the power supply utility does not require a "hard" shutdown of the **compressor** and/or the **instantaneous heating water heater**, it is sufficient to connect the power-OFF contact to the junction box (Ⓓ mandatory requirement). The operating component will then be locked out by the control unit.



Ⓐ No power-OFF in this position
Ⓑ Control contact ripple control receiver "power-OFF"
Ⓒ Terminals in the control panel
Ⓓ The air and creepage gap must exceed 8 mm, since the control input is a low voltage input

Power supply

Danger
Incorrectly executed electrical installations can lead to injury through the transmission of dangerous body currents and result in equipment damage.
Carry out the power supply connection and all earthing measures (i.e RCD circuit) in accordance with IEC 364, the requirements of your local power supply utility, VDE or local and national regulations.

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Power supply (cont.)

Main isolator requirements (if necessary)

If a main isolator is set, it must isolate the power circuit with at least 3 mm contact separation.

If no main isolator is set, all non-earthed cables must be isolated by the upstream cable protection switch with at least 3 mm contact separation.

General information regarding the power supply

The power supply is separated into 3 areas:
- Control unit feed (electronics)
- Instantaneous heating water heater feed (main power circuit)
- Heat pump compressor feed (main power circuit)

Subject to heat pump, the equipment is connected to a 400 V three phase AC or 230 V single phase AC supply. The feed for the control unit and the instantaneous heating water heater is provided on the main connecting area X60. The compressor feed comes from control module X80 (see also page 55).
The power cables to the main power circuits must have a suitable cross-section for the rated current (see specification from page 222 onwards).

Protect the power cable to the control unit with a fuse of max. 16 A.
The power fuses for the compressor must have Z characteristics.

Note
We recommend making the power connection for accessories and external components to the same fuse, with at least the same phase as the control unit.
Connection to the same fuse provides additional safety when the power is switched off. However, please pay attention to the power consumption of the consumers that are connected when doing this (control unit feed fuse protection max. 16 A).

Danger
The absence of component earthing can transfer dangerous body currents, should an electrical fault occur.
The equipment and the pipework must be connected to the earth bonding of the house in question.

! **Please note**
An incorrect phase sequence can cause damage to the unit.
The power supply to the compressor **must** have a **clockwise** rotating field in the phase sequence that is specified at the terminals.

Power supply (cont.)

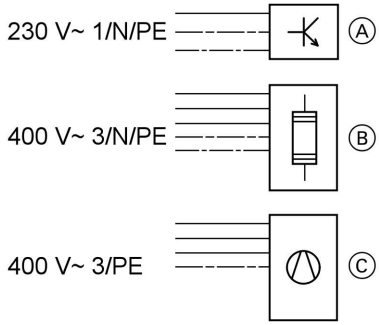
In negotiations with your power supply utility, different feed tariffs for the main power circuits may be offered. The **control unit/electronics** feed must be implemented **without** possible blocking from the power supply utility; tariffs that are subject to possible shutdowns must not be applied to these feeds.

The allocation of the power-OFF (for compressor and/or instantaneous heating water heater) is made via the control unit settings (see pages 150 and 155). Blocking of the main supply is limited to max. 3 times 2 hours per day (24 h) in Germany.

400 V~ power supply, various tariffs

- Three separate power cables
- Selective power-OFF for compressor and instantaneous heating water heater possible

The cross-section of the power cables must be appropriate for the connected load of the relevant unit.



Ⓐ Control unit
Recommended power cable: 3 x 1.5 mm^2

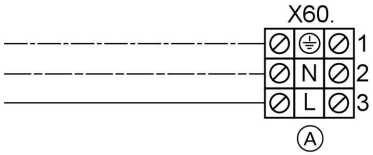
Ⓑ Instantaneous heating water heater
Recommended power cable
- 6 kW: 5 x 1.5 mm^2
- 9 kW: 5 x 2.5 mm^2

Ⓒ Compressor
Recommended power cable: 4 x 1.5 mm^2

5592 969 GB

Power supply (cont.)

Control unit power supply

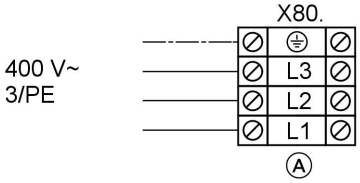


Note
*This supply must **never** be blocked*

Max. fuse rating 16 A

Ⓐ Terminals in the control panel

Compressor power supply

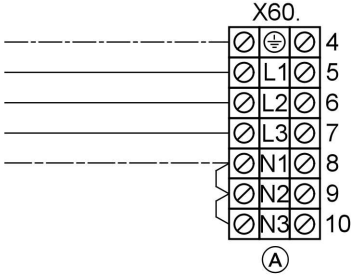


Recommended core cross-section:
1.5 mm^2

Note
The upstream fuses must have Z characteristics.

Ⓐ Terminals at the control module

Instantaneous heating water heater power supply



Max. fuse rating 16 A
Recommended core cross-section:
- 6 kW : 1.5 mm^2
- 9 kW : 2.5 mm^2

The three heating elements are switched by inserting jumpers across X60.8, X60.9 and X60.10 in star formation and must be connected to N.

Ⓐ Terminals in the control panel

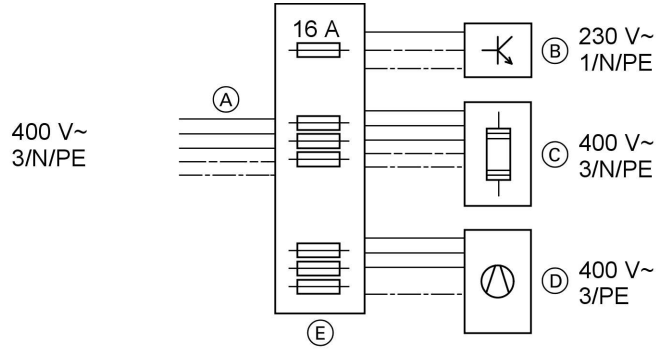
5592 969 GB

Power supply (cont.)

Power supply 400 V~, one tariff

- One common power cable with a large cross-section up to the vicinity of the heat pump.
- The common power cable cannot be blocked. Selective blocking of the individual power cable must take place downstream of the sub-distribution, resulting in additional sub-distribution cost.

Adapt the cross-section of the common power cable to the connected load of the instantaneous heating water heater and the compressor. The connected load of the control unit does not have to be taken into consideration.



Ⓐ Common heat pump power cable
Recommended power cable: 5 x 4 mm^2

Ⓑ Control unit, no power-OFF permissible
Recommended power cable: 3 x 1.5 mm^2

Ⓒ Instantaneous heating water heater
Recommended power cable:
- 6 kW: 5 x 1.5 mm^2
- 9 kW: 5 x 2.5 mm^2

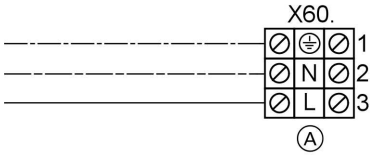
Ⓓ Compressor
Recommended power cable: 4 x 1.5 mm^2

Ⓔ Sub-distribution (near the Compact Energy Tower)

5592 969 GB

Power supply (cont.)

Control unit power supply

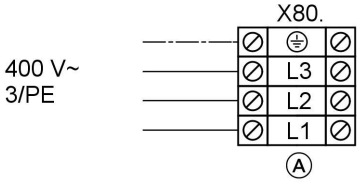


Note
*This supply must **never** be blocked.*

Max. protection 16 A.

Ⓐ Terminals in the control panel

Compressor power supply

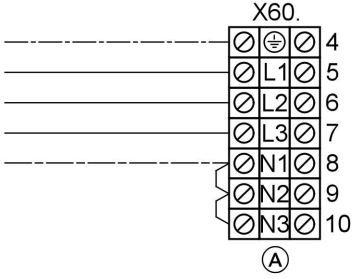


Recommended core cross-section: 1.5 mm^2

Note
The upstream fuses must have Z characteristics.

Ⓐ Terminals at the control module

Instantaneous heating water heater power supply



Max. fuse rating 16 A
Recommended core cross-section:
- 6 kW: 1.5 mm^2
- 9 kW: 2.5 mm^2

The three heating elements are switched by inserting jumpers across X60.8, X60.9 and X60.10 in star formation and must be connected to N.

Ⓐ Terminals in the control panel

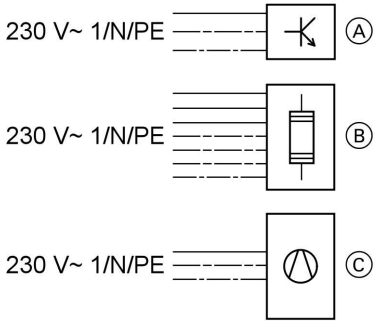
5592 969 GB

Power supply (cont.)

230 V~ power supply, various tariffs

- Three separate power cables
- Selective power-OFF for compressor and instantaneous heating water heater possible

The cross-section of the power cables must be appropriate for the connected load of the relevant unit.

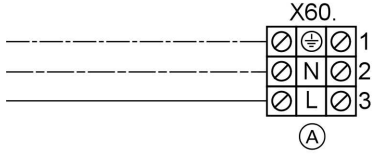


Ⓐ Control unit
Recommended power cable: 3 x 1.5 mm^2

Ⓑ Instantaneous heating water heater
Recommended power cable: 7 x 2.5 mm^2 (see also page 83)

Ⓒ Compressor
Recommended power cable: 3 x 4 mm^2

Control unit power supply



Note
*This supply must **never** be blocked.*

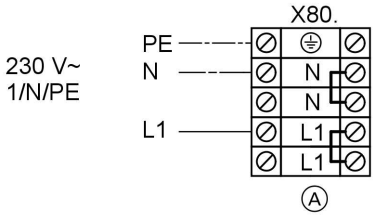
Max. protection 16 A.

Ⓐ Terminals in the control panel

5592 969 GB

Power supply (cont.)

Compressor power supply

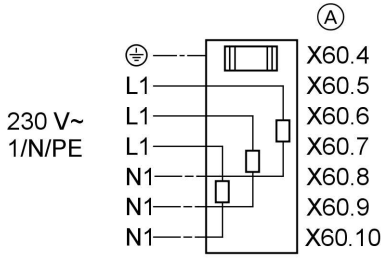


Recommended power cable: 3 x 4 mm^2

Note
The upstream fuses must have Z characteristics.

Ⓐ Terminals at the control module

Instantaneous heating water heater power supply



Each heater winding requires its own neutral conductor. **Never** bridge the neutral conductor without increasing the cross-section.
Blue flexible tubing has been provided with the unit for marking the neutral conductors in accordance with VDE 0100, part 430.

Ⓐ Terminals in the control panel
Max. fuse rating 16 A
Recommended power cable:
- 6 kW: 7 x 1.5 mm^2
- 9 kW: 7 x 2.5 mm^2

Max. lead length: 30 m

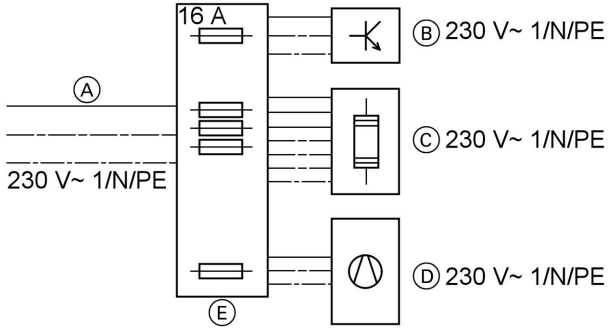
Danger
Incomplete phase shutdowns can lead to the transfer of dangerous body currents, should an electrical fault occur.
The circuit breakers must be mechanically **blocked** together. The use of individual circuit breakers is not acceptable.

Power supply 230 V~, one tariff

- One common power cable with a large cross-section up to the vicinity of the heat pump.
- The common power cable cannot be blocked. Selective blocking of the individual power cable must take place downstream of the sub-distribution, resulting in additional sub-distribution cost.

Power supply (cont.)

Adapt the cross-section of common power cable to the connected load of the instantaneous heating water heater and the compressor. The connected load of the control unit does not have to be taken into consideration.



Ⓐ Common heat pump power cable
Recommended power cable: 3 x 10 mm^2

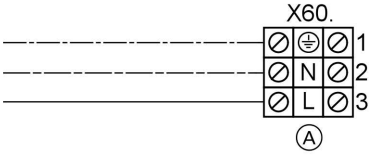
Ⓑ Control unit, no power-OFF permissible
Recommended power cable: 3 x 1.5 mm^2

Ⓒ Instantaneous heating water heater
Recommended power cable: 7 x 2.5 mm^2 (see also page 83)

Ⓓ Compressor
Recommended power cable: 3 x 4 mm^2

Ⓔ Sub-distribution (near the Compact Energy Tower)

Control unit power supply



Note
*This supply must **never** be blocked.*

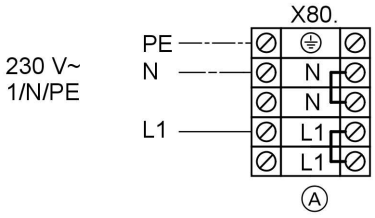
Max. protection 16 A.

Ⓐ Terminals in the control panel

5592 969 GB

Power supply (cont.)

Compressor power supply

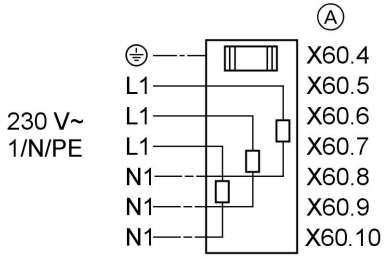


Recommended power cable: 3 x 4 mm^2

Note
The upstream fuses must have Z characteristics.

Ⓐ Terminals at the control module

Instantaneous heating water heater power supply



Each heater winding requires its own neutral conductor. **Never** bridge the neutral conductor without increasing the cross-section.
Blue flexible tubing has been provided with the unit for marking the neutral conductors in accordance with VDE 0100, part 430.

Ⓐ Terminals in the control panel
Max. fuse rating 16 A
Recommended power cable:
- 6 kW: 7 x 1.5 mm^2
- 9 kW: 7 x 2.5 mm^2

Max. lead length: 30 m

Danger
Incomplete phase shutdowns can lead to the transfer of dangerous body currents, should an electrical fault occur.
The circuit breakers must be mechanically **blocked** together. The use of individual circuit breakers is not acceptable.

Phase monitors (only with 400 V units)

The phase monitor is used to monitor the mains power supply to the compressor.
Two versions may be used.

The following power supply deviations are permitted in the delivered condition:

Power supply (cont.)

Over/undervoltage	15 %
Phase asymmetry	15 %
Switching delay	4 s

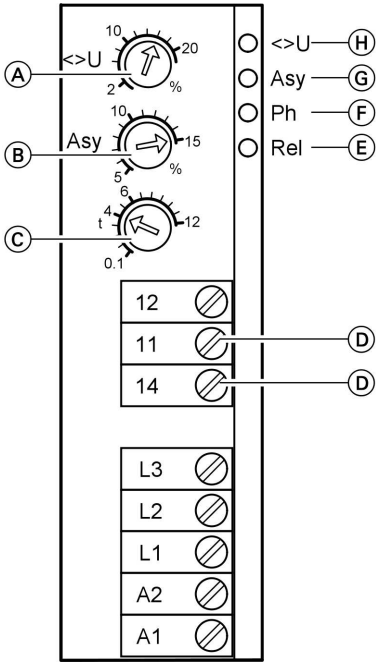
The phase monitor shuts off if these tolerance ranges are exceeded.

If the values are within the tolerance range again, the phase monitor automatically re-enables the power supply.

5592 969 GB

Power supply (cont.)

Version 1



Ⓐ Over/undervoltage in %
Ⓑ Phase asymmetry in %
Ⓒ Switching delay in s
Ⓓ Contact used in the safety chain (N/O)
Ⓔ Operating display ("Rel")
Ⓕ Fault display phase failure/phase sequence ("Ph")
Ⓖ Fault display asymmetry ("Asy")
Ⓗ Fault display over/undervoltage ("<>U")

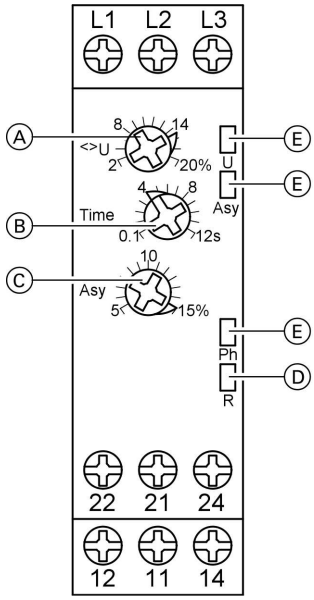
LEDs explained

- LED "Rel" illuminates green:
  All voltages and the rotating field (clockwise) are healthy.
- LED "Ph" illuminates red:
  The relay has responded; the rotating field is anti-clockwise.
- All LED's off:
  One or several phases have dropped out.
- LED "<>U" illuminates red:
  Incorrect voltage on one/several phase(s).
- LED "Asy" illuminates red:
  Incorrect voltage on one/several phase(s).

5592 969 GB

Power supply (cont.)

Version 2



Ⓐ Over/undervoltage in %
Ⓑ Switching delay in s
Ⓒ Phase asymmetry in %
Ⓓ Green LED
Ⓔ Yellow LED

LEDs explained

- LED "R" illuminates green:
  All voltages and the rotating field (clockwise) are healthy.
- LED "Ph" flashes yellow:
  The relay has responded; the rotating field is anti-clockwise.
- All LED's off:
  One or several phases have dropped out.
- LED "U" flashes yellow:
  Undervoltage on one/several phase (s).
- LED "U" illuminates yellow:
  Overvoltage on one/several phase (s).
- LED "Asy" illuminates yellow:
  Incorrect voltage on one/several phase(s).

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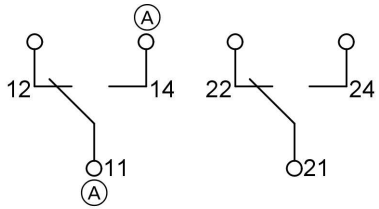
Power supply (cont.)

Relay switch contacts for activating signalling equipment or for blocking the heat pump:



Ⓐ Contact used in the safety chain (N/O)

Checking the rotating field of the power supply

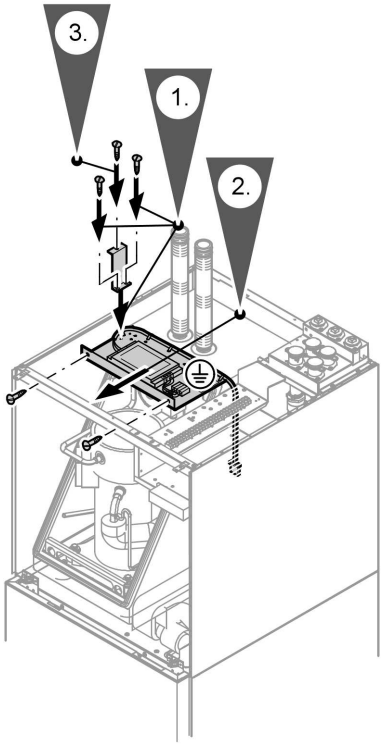
1. Switch ON the power.
   Remedy any faults that may be signalled by the phase monitor (see page 83).
2. **Isolate** the system from the power supply and **safeguard against reconnection**.

Installing a 400 V full wave soft starter (as of BWT 108)

Note
*In accordance with the previously described installation procedure, the **heat pump module** must already be **installed**. The heat pump module **cannot** be installed **after** the full wave soft starter has been installed.*

5592 969 GB

Installing a 400 V full wave soft starter (as of BWT . . . (cont.)



1. Fit the retaining bracket provided to the left side of full wave soft starter.
To do this:
- Remove cable ties from the left side of the full wave soft starter.
- Slide the retaining bracket between the cable and base plate and secure with 2 screws.
- Secure the cable with a new cable tie (lead through an opening in the base of the retaining bracket).

2. ⚠ **Danger**
The absence of component earthing can transfer dangerous body currents, should an electrical fault occur.
It is important to connect the earth strap from the crossbar to the full wave soft starter.

Attach full wave soft starter to upper crossbar with 2 screws.

3. Secure the retaining bracket to the right side panel.

4. Plug the connector from the compressor (4-pin plug with designated PE, 9, 10, 11) to the right side of the full wave soft starter.

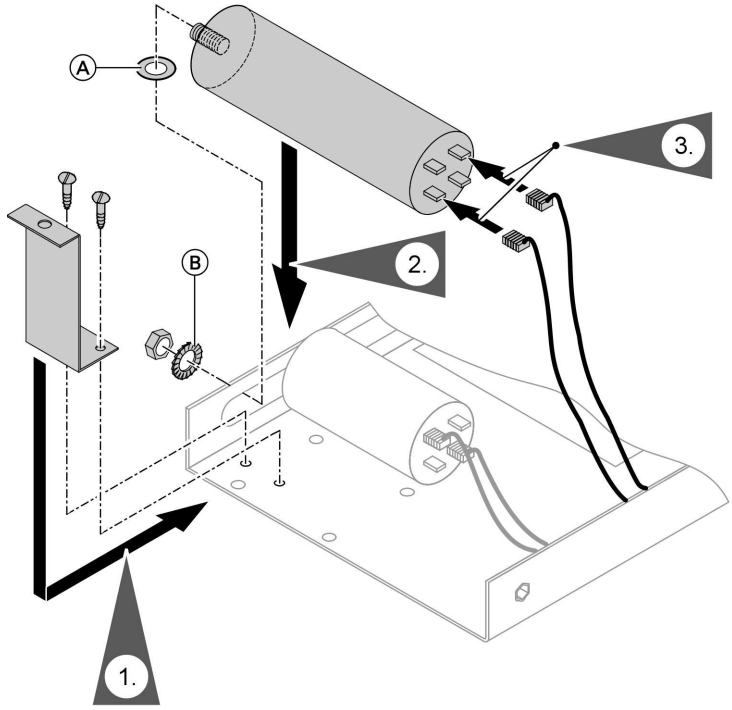
5. Plug cables from the left side of the full wave soft starter to pos. Ⓚ of the control module (see page 22).

Note
The plug must click home.

5592 969 GB

Installing a 230 V full wave soft starter (all models)

Note
*In accordance with the previously described installation procedure, the **heat pump module** must already be **installed**. The heat pump module **cannot** be installed **after** the full wave soft starter has been installed.*

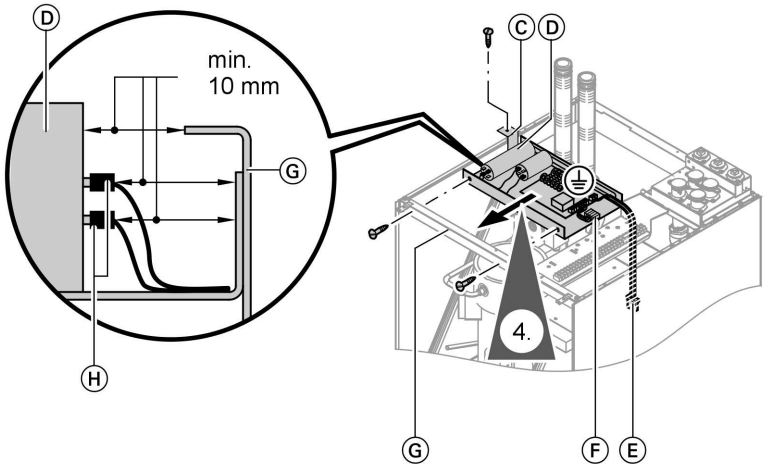


1. Attach the retaining bracket to the base plate of the full wave soft starter with 2 sheet metal screws.

2. Attach separately packed capacitor with washer Ⓐ and serrated lock washer Ⓑ to the base plate of the full wave soft starter.

3. Fit cables to tabs of capacitor in a diagonally offset position (like the capacitor that is already installed).

Installing a 230 V full wave soft starter (all . . . (cont.)



4. **Danger**
The absence of component earthing can transfer dangerous body currents, should an electrical fault occur.
It is important to connect the earth strap from the crossbar to the full wave soft starter.

Attach full wave soft starter to upper crossbar with 2 screws. Secure retaining bracket Ⓒ to the edge of the left side panel.

Note
Pay attention to distance between capacitor Ⓓ with cables attached Ⓗ and crossbar Ⓖ and the edge of the crossbar as shown in illustration.

5. Plug connector from compressor (6-pin plug with designation PE, N, L, S, 230, 231) to mating plug Ⓕ on the right side of the full wave soft starter.

Note
The plug must click home.

6. Plug cable Ⓔ of the full wave soft starter to pos. Ⓚ of control module (see page 25).

Note
The plug must click home.

5592 969 GB

Making the electrical heat pump connections

1. **Only with model BWT 106 in 400 V version:**
   Push the compressor connection into pos. Ⓚ at the control module (see page 22).

2. Push the safety chain connection (4-pin plug with designation 1, 2, 3, 4) into pos. Ⓔ at the control module (see page 22).
   Push the primary pump connection (3-pin plug with designation PE, 5, 6) into pos. Ⓓ at the control module (see page 22).

   Note
   The plugs must click home.

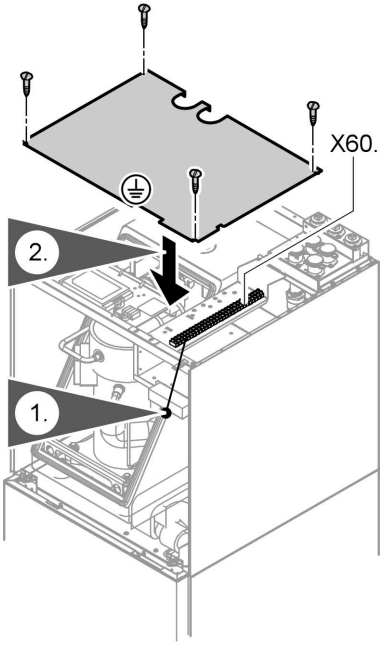
3. Push the primary temperature sensor connection (2-pole, LV) into the mating plug on the control panel.

4. **Please note**
   To prevent damage to the electrical cables, route cables so that they cannot touch extremely hot, vibrating or sharp-edged components.
   Secure cables with cable ties.

   Bundle the cables and secure with cable tie below the control panel. The transfer plugs at the control unit must be fitted with strain reliefs.

5592 969 GB

Connecting the brine pressure switch or a jumper

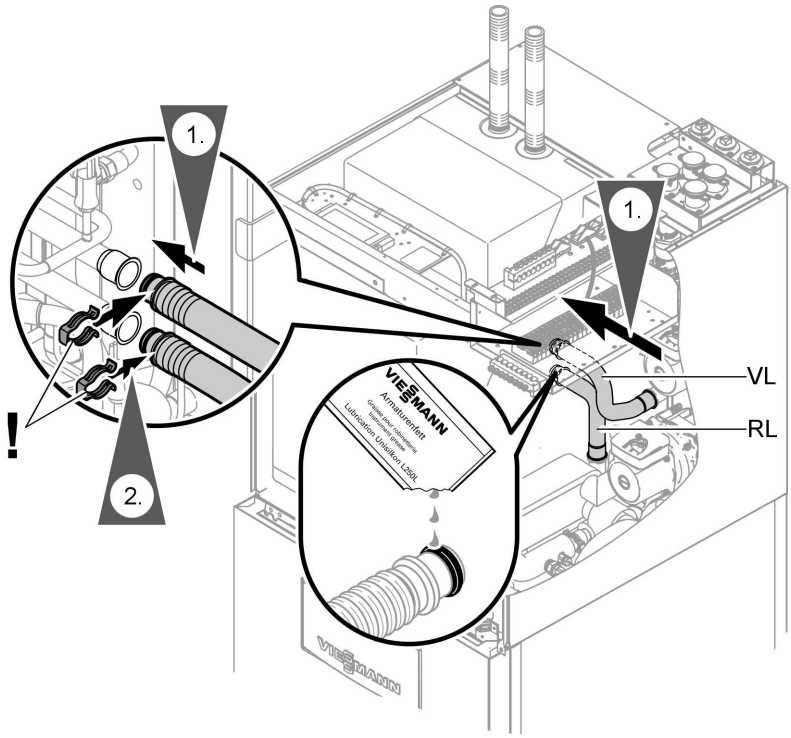


1. The brine pressure switch is connected across terminals X60.11 and X60.12 at the top of the control panel (see also page 69).
   If **no** brine pressure switch is connected, **always** connect the jumper (in the pack) across these terminals.

2. Fit the front top panel.

5592 969 GB

Connecting the secondary circuit



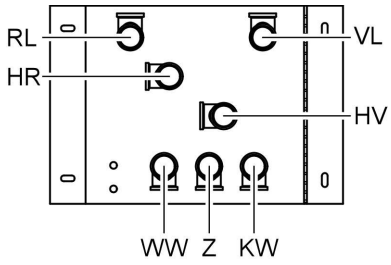
VL Secondary circuit flow

RL Secondary circuit return

1. Route the corrugated stainless steel pipes of the secondary flow and return through both apertures in the thermal insulation, and push them onto the heat pump connectors behind the insulation.

2. **Secure** the corrugated pipes to the connectors with the clips provided.

Connection panel

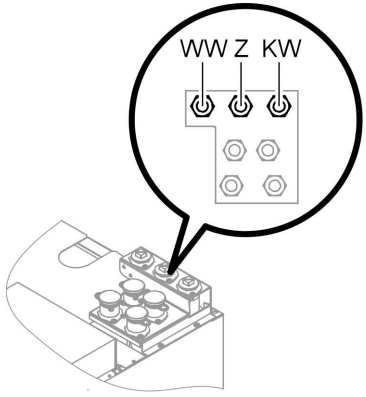


HR Heating return
HV Heating flow
KW Cold water
RL Solar return
VL Solar flow
WW DHW
Z DHW circulation

We recommend the use of the connection panel (accessories) and associated connecting lines, fittings (accessories) and extensions for the DHW circulation, the solar and the heating circuit to make the hydraulic connections (see page 26).
Installation location, see page 12.
All connections R ¾".

Note
The panel connections on the solar side are not required for the Vitocal 222.

Connecting the DHW



KW Cold water (R ¾")
WW DHW (R ¾")
Z DHW circulation (R ¾")

Connect the DHW pipework with detachable fittings in accordance with the adjacent diagram.

Note
Pressure seal *any connections that are not required.*
Equip the DHW circulation pipe on site with a circulation pump and a check valve (see fig. on page 95).

Danger
DHW temperatures in excess of 60 °C can lead to scalding. At these temperatures, install anti-scalding protection on site.

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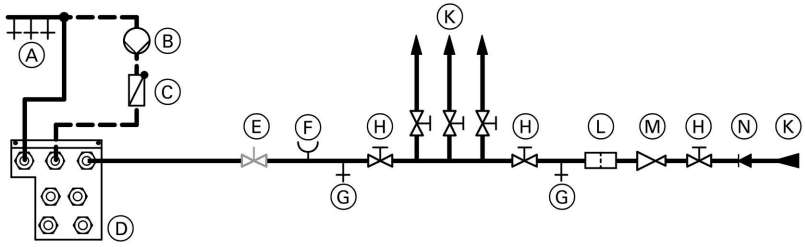
Connecting the DHW (cont.)

Connection of the Vitocal 242 on the DHW side

For the DHW connection, observe DIN 1988 and DIN 4753.



Ⓐ Domestic hot water
Ⓑ DHW circulation pump
Ⓒ Spring-loaded check valve
Ⓓ Hydraulic connection array of the Compact Energy Tower (top view)
Ⓔ Flow regulating valve
Ⓕ Pressure gauge connection
Ⓖ Drain valve
Ⓗ Shut-off valve
Ⓚ Cold water
Ⓛ Drinking water filter
Ⓜ Pressure reducer
Ⓝ Non-return valve/pipe separator

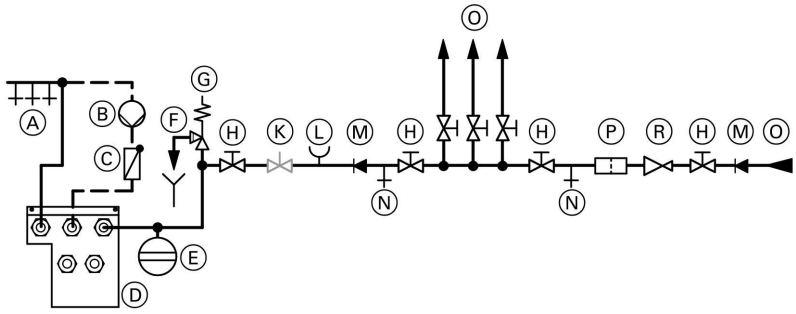
Note
A safety valve with visible outlet of the blow-off line (to DIN 1988) and a shut-off and drain valve as well as a check valve are integrated on the DHW side of the device.

Connection of the Vitocal 222 on the DHW side

For the DHW connection, observe DIN 1988 and DIN 4753.

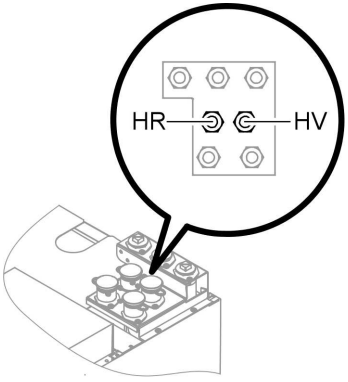
5592 969 GB

Connecting the DHW (cont.)



Ⓐ DHW
Ⓑ DHW circulation pump
Ⓒ Spring-loaded check valve
Ⓓ Hydraulic connection array of the Compact Energy Tower (top view)
Ⓔ Diaphragm expansion vessel
Ⓕ Visible blow-off line outlet
Ⓖ Safety valve
Ⓗ Shut-off valve
Ⓚ Flow regulating valve
Ⓛ Pressure gauge connection
Ⓜ Non-return valve/pipe separator
Ⓝ Drain valve
Ⓞ Cold water
Ⓟ Drinking water filter
Ⓡ Pressure reducer

Connecting the heating circuit



HR Heating return (Multi-connect system)
HV Heating flow (Multi-connect system)

Connect the heating circuit according to the adjacent diagram.

! **Please note**
With **underfloor heating circuits**, there is a risk of building damage through the screed overheating if the control unit fails.
Equip **underfloor heating circuits** with a temperature limiter.

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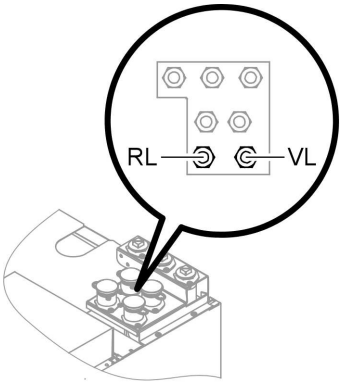
Connecting the heating circuit (cont.)

Note
Design the heating circuit as a single line heating circuit or with an overflow valve (minimum flow rate 700 l/h) and fill via boiler fill & drain valve Ⓒ (see page 108).
Equip the heating circuit on site with a diaphragm expansion vessel.

Connecting the solar circuit (option, only for the Vitocal 242)



Connect the solar circuit according to the adjacent diagram.

Note
Equip the solar circuit on site with a diaphragm expansion vessel.
The solar circuit pump is integrated in the Vitocal 242.

RL Solar return (Multi-connect system)
VL Solar flow (Multi-connect system)

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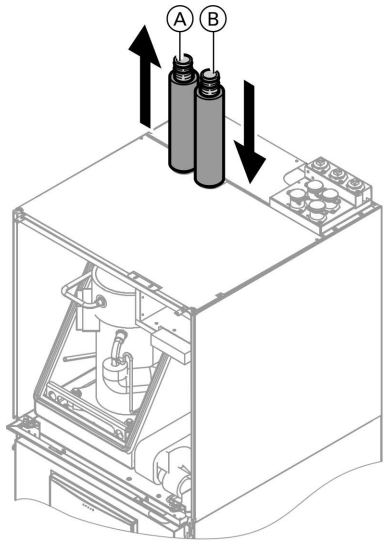
Connecting the brine side



Ⓐ Primary outlet
Ⓑ Primary inlet

- The components used must be resistant to the "Tyfocor" heat transfer medium (**never use galvanised** pipes for the brine circuit or the solar circuit).
- To ensure the perfect operation of the brine circuit, route pipes so that air pockets cannot form and that complete venting is ensured.
- Equip the brine circuit with a diaphragm expansion vessel and safety valve as described in DIN 4757.
- The expansion vessel must be approved in accordance with DIN 4807. The diaphragms and seals of the expansion vessel and the safety valve must be suitable for the heat transfer medium.
  For calculating the pre-charge pressure of the diaphragm expansion vessel, see the "Vitocal 200/222/242" technical guide.
- Ensure adequate thermal and sound insulation of all pipes routed through walls.
- Insulate lines inside the building to provide protection from heat and vapour diffusion.
- Blow-off and drainage lines must converge in one container that can hold the maximum possible expansion volume of the heat transfer medium.
- Fill the solar circuit with Viessmann "Tyfocor" heat transfer medium (ethylene glycol: water mixture with frost protection down to −15 °C).

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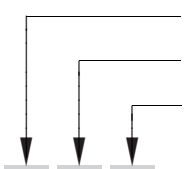
Steps - commissioning, inspection and maintenance

For further information regarding the individual steps, see the page indicated



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•			**2. Maintaining service reports**	101
•	•	•	**3. Switching OFF/disconnecting the main fuse**	
	•	•	**4. Checking the refrigerant circuit for leaks**	101
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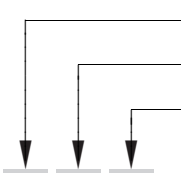
Steps - commissioning, inspection and . . . (cont.)



				Page
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Further details regarding the individual steps

Removing the front panels

Danger
Touching 'live' components can result in the transfer of dangerous body currents.
Never touch the connections inside the control panel or in the control module below.

Danger
The absence of earthing on the components can transfer dangerous body currents and may damage the equipment, should an electrical fault occur.
Always re-connect the earth strap when re-fitting the cover.

Please note
To prevent equipment damage, wait **at least 30 min** between the installation and the commissioning of the equipment.
Work on the **refrigeration circuit** must only be carried out by a qualified **refrigeration engineer**.

Observe the operating instructions when commissioning the equipment.

Remove the front panels for commissioning, inspection and maintenance work.

Maintaining service reports

Enter measurements taken during commissioning described in the following in the reports from page 216 onwards.

Checking the refrigerant circuit for leaks

Check the heat pump interior with a refrigerant leak detector or leak detection spray for refrigerant leaks.

1. Remove the front panels (see page 56).
2. Remove the front part of the heat pump thermal insulation (see page 59).
3. Check the floor area, valves and all visible solder joints of the heat pump for traces of oil.

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Further details regarding the individual steps (cont.)

Filling the primary circuit, venting it and checking its pressure

! **Please note**
To prevent equipment damage, it is vital to prevent the compressor from being started if the primary circuit **has not been filled**.
For this, pull the plug-in connector from the compressor (see page 91).

1. **Only for commissioning:**
   Flush the primary circuit.
2. **Only for commissioning:**
   Fill the primary circuit with heat transfer medium "Tyfocor −15 °C" and vent the circuit.
3. Check the primary circuit pressure. The pressure should be approx. 2 bar.
4. Check and, if required, adjust the pre-charge pressure of the diaphragm expansion vessel (see page 106).

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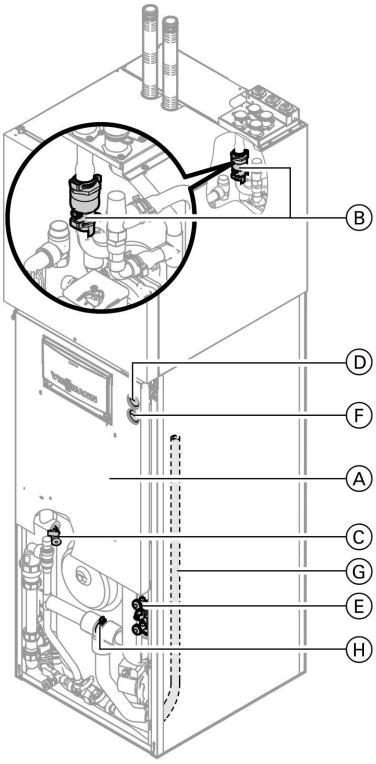
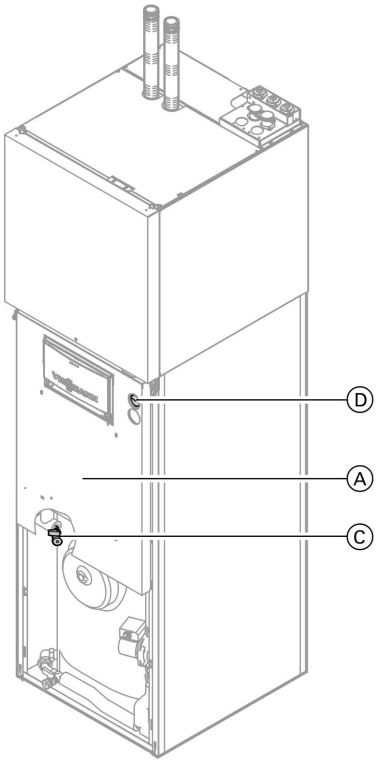
Further details regarding the individual steps (cont.)

Filling and venting the heating side of the equipment



Vitocal 242



Vitocal 222

Ⓐ Electrical component cover
Ⓑ Non-return valve **(only with Vitocal 242)**
Ⓒ Boiler fill & drain valve — heating circuit
Ⓓ Heating circuit pressure gauge
Ⓔ Fill valve, solar circuit **(only with Vitocal 242)**
Ⓕ Pressure gauge, solar circuit **(only with Vitocal 242)**

Further details regarding the individual steps (cont.)

Ⓖ Sight hose, Tyfocor drip container **(only with Vitocal 242)**
Ⓗ Three-way diverter valve (manual) **(only with Vitocal 242)**

1. Open any non-return valves installed on site.

2. Check the pre-charge pressure of the diaphragm expansion vessel (see page 106).

3. Thoroughly flush the on-site pipework.

4. Fill the heating circuit via fill & drain valve Ⓒ with water; during filling, check the system pressure at pressure gauge Ⓓ.

Minimum system pressure	0.8 bar
Permissible operating pressure	3.0 bar

5. Close fill & drain valve Ⓒ.

6. Open a suitable air vent valve in the heating circuit.

7. Switch ON the power.

8. Set the operating mode selector (see page 123) to "⏻".

9. Start the equipment at the system ON/OFF switch (see page 192).

10. ***Note***
Pay attention to information concerning control operation (from page 123), select language if necessary (see page 109, default setting "German").

Start the commissioning program for the heating circuit:

Menu item
- "**Device settings**"
- "**Contractor level**"
  Enter the **code** for "**Heating contractors**" (see page 142).
- "**Commissioning**"

11. **Please note**
To prevent equipment damage,
check the flow and return connections of the secondary heat pump circuit for leaks (see page 93).
In case of leaks, immediately shut down the equipment, drain the water and check the seating of the seal rings. Replace all seal rings that may have slipped.

Let the commissioning program run until the equipment is fully vented. For this, observe the system pressure; should that drop below 0.8 bar, top up with water.

12. Close the air vent valve.

13. Terminate the commissioning program with key "**BACK**".

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Further details regarding the individual steps (cont.)

Filling and venting the solar side of the system (only for the Vitocal 242)

Danger
Overheated collector areas and overheated heat transfer medium can cause burns and equipment damage.
When working on the collector and the heat transfer medium circuit, protect the collector areas against solar irradiation.

1. Open non-return valve Ⓑ(see page 108).

2. Thoroughly flush the on-site pipework.

3. Fill the solar circuit via fill valve Ⓔ (see page 108) with "Tyfocor G-LS". During filling, check the system pressure at pressure gauge Ⓕ (see page 108).
   Minimum system pressure: 1.7 bar
   Permiss. operating pressure: 3.5 bar

   Please note
   To prevent equipment damage, **always** use "Tyfocor G-LS".
   Never fill with water.

4. Close ball valve of fill valve Ⓔ (see page 108).

5. Open the air vent valve at the solar collector.

6. Switch ON the power.

7. Set the operating mode selector (see page 123) to "⏻".

8. Start the equipment at the system ON/OFF switch (see page 192) 123.

9. Start the solar circuit pump:

   Menu item
   - "**Device settings**"
   - "**Contractor level**"
     Enter the **code** for "**Heating contractors**" (see page 142).
   - "**Manual control**"
   - "**Relay**"
     With "**RESET**", set all relays to "**OFF**".
     Use keys [↑]/[↓] to select "**solar circuit pump**" and activate with "**ON**".
   - "**OK**"

10. Let the pump run until the equipment is fully vented. For this, observe the system pressure at pressure gauge Ⓕ; should that drop below 1.7 bar, top up with "Tyfocor G-LS".

11. Close the air vent valve.

12. Switch OFF the pumps:

    Menu item
    - "**Relay**"
    - With "**RESET**", set all relays to "OFF".
    - "**OK**"
    - "**BACK**" to the main menu

Further details regarding the individual steps (cont.)

Checking the diaphragm expansion vessel of the heating circuit and its pressure

Carry out this test on a cold system.

Note
Only use anti-corrosion agents offered by the heating trade that have been approved for heat pumps with DHW heating via single-walled heat exchangers (DHW cylinders).

1. Drain the primary side of the boiler system and reduce the pressure until pressure gauge Ⓓ (see page 108) indicates "0".

2. If the pre-charge pressure of the diaphragm expansion vessel is lower than the static system pressure, top up with sufficient nitrogen to raise the pre-charge pressure higher than the static system pressure.

   Example:

Static head (distance between the heat source and the highest heating surface)	10 m
= static pressure	1 bar

3. Top up with water, until the filling pressure exceeds the pre-charge pressure of the diaphragm expansion vessel.
   On a cold system, the fill pressure must be approx. 0.2 bar higher than the static pressure.
   Max. operating pressure: 3.5 bar.

4. During commissioning, mark this value on pressure gauge Ⓓ (see page 108) as minimum filling value.

Checking the diaphragm expansion vessel of the solar circuit and its pressure (only for the Vitocal 242, if required)

Carry out this test on a cold system.

! **Please note**
Risk of equipment damage from incorrect heat transfer medium concentration.
Only top up with "Tyfocor G-LS".

Further details regarding the individual steps (cont.)

Commissioning

Observe the static head of the solar circuit.
Pre-charge pressure of the diaphragm expansion vessel for the solar circuit:
1.0 bar + 0.1 x static height in m.

Note
Mark this calculated fill pressure on pressure gauge Ⓕ (see page 108) as minimum fill value.

Only for inspection and maintenance

Check the system pressure:

Minimum system pressure	1.7 bar
Permissible operating pressure	3.5 bar

Checking the Tyfocor drip container (only for the Vitocal 242, if required)

Note
The container should not be filled with Tyfocor any higher than approx. 10 cm. Higher Tyfocor volumes indicate a faulty system.

Possible faults are:
- *Solar circuit safety valve faulty*
- *On-site solar circuit diaphragm expansion vessel faulty*
- *Solar collector and/or diaphragm expansion vessel incorrectly sized*

1. Check the container level in sight glass Ⓖ (see page 108).

Note
*The container itself is located on the r.h. side behind the DHW cylinder and is **not** accessible.*

2. Drain any heat transfer medium that may be in the container as follows:
- Undo the cable ties on the sight hose
- Pull the sight hose forward out of the equipment
- Let the heat transfer medium drain into a vessel of sufficient size.

Note
The container holds approx. 9 litres.

3. Re-insert the sight hose into its original position inside the equipment and secure it with cable ties.

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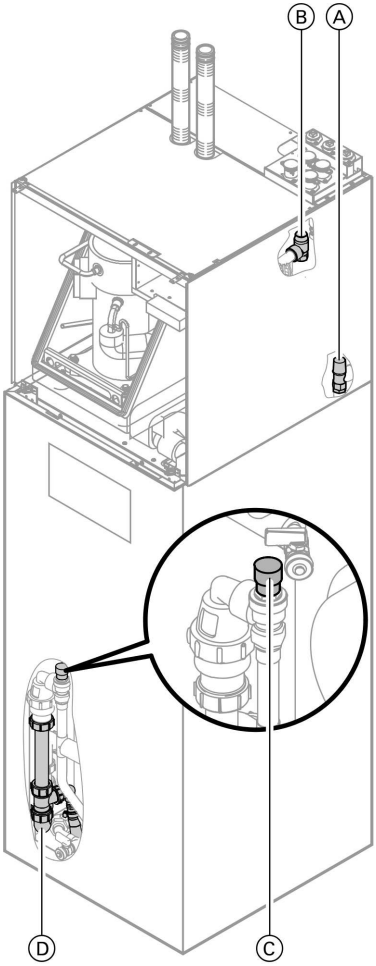
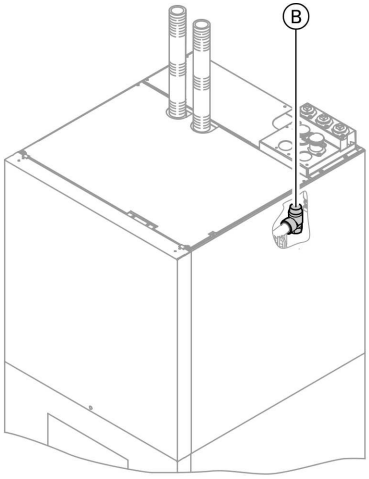
Further details regarding the individual steps (cont.)

Checking the safety valve and siphon function



Vitocal 242



Vitocal 222

Vitocal 242:

Check the function of the safety valves on the solar Ⓐ, heating water Ⓑ and DHW side Ⓒ.

Vitocal 222:

Check the function of the safety valve on the heating water side Ⓑ (external).

Note
Check the safety valves on the heating circuit and DHW sides by venting them for approx. 60 s.
Then check all fittings on siphon Ⓓ for leaks.

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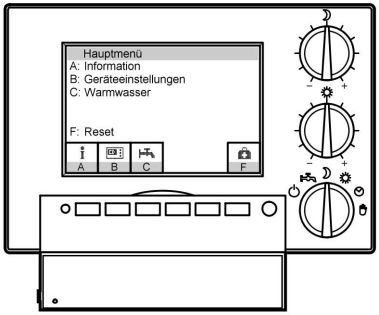
Further details regarding the individual steps (cont.)

System configuration

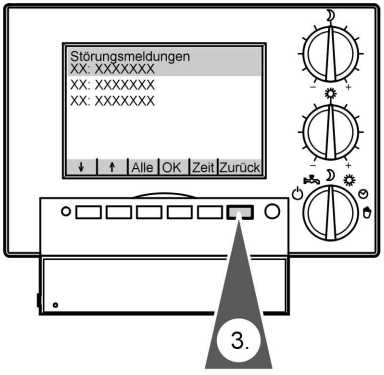
Enable the system design used (see from page 13) and any optional components and functions at the control unit.

Only required outside German-speaking countries: Setting the display language



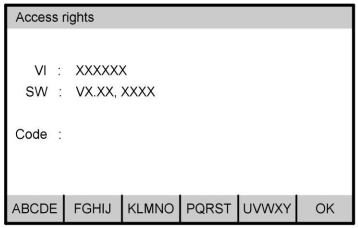
1. Open cover of programming unit (see page 123 and operating instructions).

2. **If the adjacent display appears:** Continue with point 4.



3. **If the adjacent display appears (fault messages present):** Press key marked in diagram.

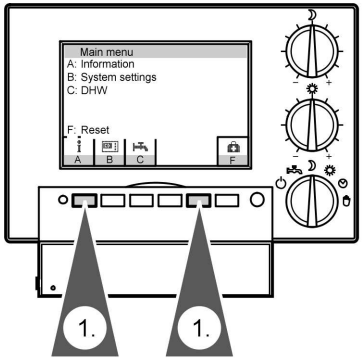
Further details regarding the individual steps (cont.)



4. ■ Press the following keys one after the other:
"⊡" and "🔒"
■ Enter the code for heating contractors ("SERVICE"; for details see page 142).
■ Press the following keys one after the other:
"📖" and "🔧"

5. Select language:
■ Select area marked Ⓐ in diagram using [↓].
■ Press [>>>].
■ Select the required language using [↓].
■ Confirm language selection using [OK].
■ Press [OK] and ↩ several times to return to "**main menu**".

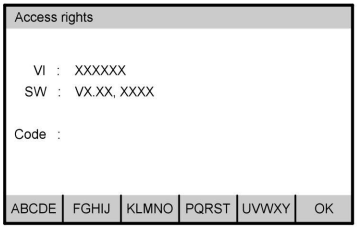
Selecting a system design



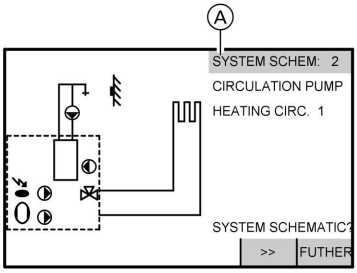
1. Briefly and simultaneously press the keys shown in the diagram.

Note
For alternative access, see page 147.

Further details regarding the individual steps (cont.)



2. **Only if the code request is displayed:**
   Enter the code for heating contractors ("SERVICE"; for details see page 142).

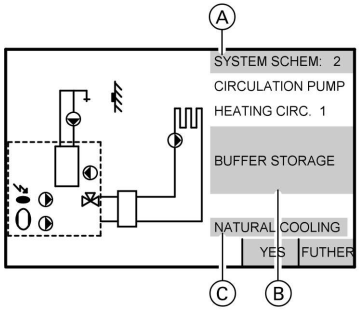


3. Select the required system design (2, 4 or 6) with **>>**.

   Note
   The selected system design is shown in the display area marked Ⓐ.

Select the installed auxiliary components or functions

Note
*With system designs 2 to 6, the "**Solar collector**" and/or "**Natural cooling**" options can be selected or deselected.*
For system design 2, a heating water buffer cylinder can also be selected or deselected.



1. Start the selection or deselection of auxiliary components for the displayed system design with "**CONTINUE**".

Further details regarding the individual steps (cont.)

2. Select or deselect the component displayed above the keys (area Ⓒ, see diagram) with "**YES**"/"**NO**".

   Note
   *The relevant component is not yet selected if the key function **"YES"** is displayed.*
   *If you then press the key, the component will be selected and the key function changes to **"NO"**.*
   You can deselect that component by pressing the key again.
   The selected components are listed in the display area marked Ⓑ.

Example:
In the example for system design 2 (area Ⓐ), the "**Buffer cylinder**" function (area Ⓑ) has already been selected, the "**Natural cooling**" function, however, has not (area Ⓒ).

Pressing "**CONTINUE**" in the example shown will lead to the natural cooling function being excluded from the system design.

3. Confirm your choice by pressing "**CONTINUE**" (component selected or "ignored") and continue to the next available component for possible selection.

4. Pressing "**CONTINUE**" again saves the system configuration once all available components for the specific system design have either been selected or deselected ("ignored").
   The configuration program is terminated automatically.

Checking the antifreeze concentration in the brine circuit

Check the antifreeze concentration and record it in the service report from page 216.

The system must be protected against frost down to −15°C. Otherwise, replace the Tyfocor charge.

Checking the sensor connections

Check whether all sensors have been connected as per the connection diagrams on pages 194 and 202.

For this, scan "Sensor temperatures".

Operating instructions

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Further details regarding the individual steps (cont.)

Checking the secondary pump

1. Start the test program:

Menu item
- **"Device settings"**
- **"Contractor level"**
- **"Commissioning"**
- **"Secondary pump"**

Note
The time elapsed since the start of the test program is shown in the top r.h. corner of the display. Furthermore, the status of all components that are part of the test procedure is displayed.

2. "Sensor temperatures"
Observe the temperatures at the "**Secondary flow**" and the "**Secondary return**". The temperatures must rise.
Otherwise check the instantaneous heating water heater (see page 129, fault message "D7").
The flow rate is too low if, after prolonged operation (10 to 30 min), the temperature differential ΔT > 3 K.
Increasing the flow rate:
- Vent the equipment again (see page 102)
- Increase the speed of the secondary pump
- Replace the pump, if required

3. Set the "Heating/DHW" mixer with **0%** to "0".

4. See item 2.

5. Terminate the test program with "**BACK**".

Further details regarding the individual steps (cont.)

Checking the solar circuit pump (only for the Vitocal 242)

1. Start the test program:

   Menu item
   - **"Device settings"**
   - **"Contractor level"**
   - **"Commissioning"**
   - **"Solar collector"**

   Note
   *For checking the solar circuit pump, the temperature at the **"Solar collector"** should be 10 K higher than that at the **"Solar return"**.*
   The time elapsed since the start of the test program is shown in the top r.h. corner of the display. In addition, the status of all components that are part of the test program, is displayed.

2. Observe the solar circuit return temperature.
   After a few seconds, the temperature at the **"Solar return"** must rise.

3. Record the results in the service report from page 216.

4. Terminate the test program with **"BACK"**.

Checking the external heating circuit pumps

Note
The following test program is not required for system version 1 (without external heating circuit pump).

Further details regarding the individual steps (cont.)

1. Start the test program:

   Menu item
   - **"Device settings"**
   - **"Contractor level"**
   - **"Commissioning"**
   - **"Further menu items"**
   - **"Heating circuit 1 pump"**
     or
     "Heating circuit 2 pump"
     (if installed)

   Note
   The time elapsed since the start of the test program is shown in the top r.h. corner of the display. Furthermore, the status of all components that are part of the test procedure is displayed.

2. Determine the temperature differential between the heating flow and return of the respective heating circuit using a contact thermometer.

3. Determine and enter the actual values and test conditions in accordance with the commissioning/service report from page 216.

4. The heating flow temperature must reach the temperature at the **"Buffer cylinder"** ± 2 K; the heating return temperature must be higher than the room temperature. Otherwise the throughput is inadequate.
   Increasing the flow rate:
   - Vent the heating circuits
   - Increase the speed of the pump of the auxiliary heating circuit
   - Replace the pump, if required

5. Terminate the test program with **"BACK"**.

Checking the primary pump

1. Start the test program:

   Menu item
   - **"Device settings"**
   - **"Contractor level"**
   - **"Commissioning"**
   - **"Primary pump"**

   Note
   The time elapsed since the start of the test program is shown in the top r.h. corner of the display. Furthermore, the status of all components that are part of the test procedure is displayed.

2. Check the circulation on the primary side (brine circuit):
   - The primary inlet (display **"Primary in"**) and outlet (no display, use contact thermometer) must show identical, low temperatures.
   - The pump casing of the primary cooling circuit pump must not heat up (check by touching the casing).

   Otherwise:
   - Vent the primary circuit
   - Check the pump connections
   - Change the pump stage
   - If required, use a larger pump

Further details regarding the individual steps (cont.)

3. Start the compressor by pressing "**ON**".

   Note
   The compressor will start automatically after expiry of the 250 s long test.

4. Determine the temperature differential ΔT between the primary inlet (display "**Primary in**") and outlet (no display, use contact thermometer).
   Set values ΔT:
   - 3 to 5 K at 35 °C for "**Secondary flow**" and 10 °C for "**Primary in**"
   - 2 to 4 K at 35 °C for "**Secondary flow**" and 0 °C for "**Primary in**"

5. Record the results in the service report from page 216.
   If the set values are not achieved:
   - Vent the primary circuit
   - Check the pump connections
   - Change the pump stage
   - If required, use a larger pump

6. Terminate the test program with "**BACK**".

Checking mixers, heat pump and cylinder heating

Checking the mixer and heat pump

1. Start the test program:

   Menu item
   - "**Device settings**"
   - "**Contractor level**"
   - "**Commissioning**"
   - "**Compressor**"

2. Start the compressor by pressing "**ON**".

   Note
   The compressor will start automatically after expiry of the 250 s long test.

3. Check the following temperature and record it in the service record sheet from page 216:
   The temperature at "**DHW cylinder top**" must remain constant (tolerance: ±1 K).

   Otherwise:
   - Check whether the mixer is correctly adjusted
   - Check the electrical mixer connections (see page 200)
   - Replace the mixer, if required

Further details regarding the individual steps (cont.)

4. Check the following temperature and record it in the service report from page 216:
   The temperature at the "**Secondary flow**" must rise (observe a rise up to approx. 30 °C).

   Otherwise:
   - Check the primary pump
   - Check the electrical connections of the components concerned
   - Check the casing temperature of the heat pump compressor (see page 118).

5. Check the following temperature and record it in the service record sheet from page 216:
   The spread between the secondary flow and the secondary return must be 6 to 8 K.
   Otherwise, match the stage of the secondary pump to requirements.

Checking the cylinder heating by the heat pump

1. Set the "Heating/DHW" mixer for cylinder heating with key "**100%**" to "**100%**".

2. Observe the temperatures at the "**Secondary flow**" and the "**DHW cylinder top**" for approx. 10 min.
   Both temperatures must rise.
   Otherwise:
   - Check whether the mixer is correctly adjusted
   - Check the electrical mixer connections (see page 200)
   - Replace the mixer, if required

3. Terminate the test program with "**BACK**".

Checking the high pressure switch

1. Switch ON heat pump (see page 116, section entitled "Checking the mixer, the heat pump and the cylinder heating", points 1 and 2).

2. Choke the heating flow, until the flow temperature rises above 60 °C (but no higher than 70 °C).
   The HP switch must shut the compressor down.

Further details regarding the individual steps (cont.)

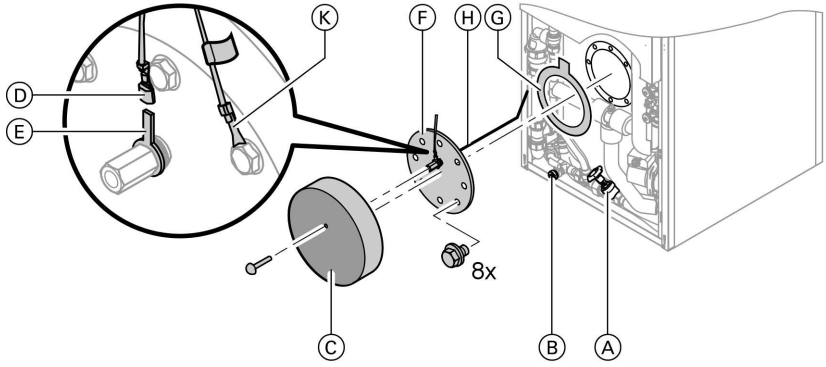
Checking the compressor casing temperature

1. Release the front top panel.
2. Undo the screws and the crossbar.
3. Start the heat pump and let it run for at least 10 min (see page 116, point 1 and 2).
4. Measure the temperature of the compressor casing exterior while it is in operation.
   Ice must not form on the outside of the compressor, and the housing must not become warmer than 60 °C (otherwise consult the Technical Service department at Viessmann).
5. Lift the crossbar and set the front part of the thermal insulation onto the heat pump.
6. Secure the crossbar.
7. **Danger**
   The absence of component earthing can transfer dangerous body currents, should an electrical fault occur.
   Always connect the earth strap to the crossbar and the top panel.

   Fit the front top panel.

Cleaning the interior of the DHW cylinder

Danger
An uncontrolled exit of DHW or heat transfer medium can lead to **scalding** and **building damage**.
Only open the DHW and heating water connections after the DHW cylinder has been depressurised.



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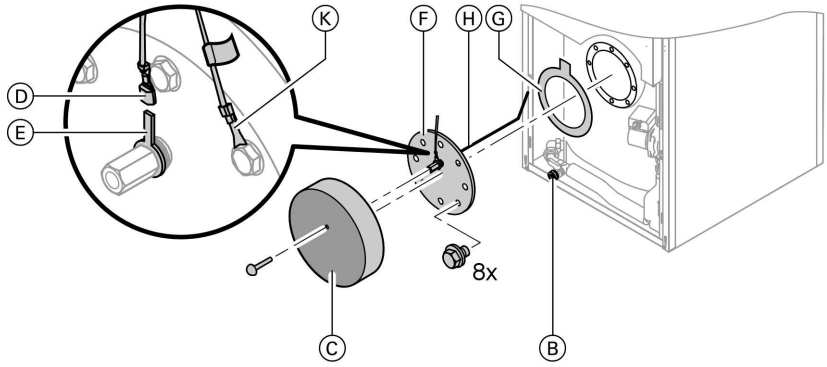
Further details regarding the individual steps (cont.)

Vitocal 242



Vitocal 222

1. Drain the DHW cylinder from the DHW side. For this, close shut-off valve Ⓐ (only for the Vitocal 242 internal) and open drain valve Ⓑ.

   Please note
   Underpressure in the DHW cylinder can lead to material damage.
   The air vent valve must always be open when the DHW cylinder is being drained with a vacuum pump.

2. Remove thermal insulation cover Ⓒ.

3. Pull anode protection connector Ⓓ from push-on tab Ⓔ.

4. Remove flange lid Ⓕ.

5. Remove loose deposits with a high pressure cleaner.

   Please note
   Pointed or sharp-edged objects can damage the DHW cylinder.
   Only use plastic cleaning equipment to clean the inside.

Note
Manually remove coarse dirt particles that cannot be flushed out through the air vent valve.

Further details regarding the individual steps (cont.)

6. Use a chemical cleaning agent to remove hard deposits that cannot be removed with a high pressure cleaner.

   Please note
   Cleaning agents containing hydrochloric acid can attack the material of the DHW cylinder.
   Never use such cleaning agents.

7. Thoroughly flush the DHW cylinder after cleaning.

8. Close drain valve Ⓑ.

9. Insert new gasket Ⓖ underneath flange lid Ⓕ.

   Note
   If the impressed current anode is to be replaced (see page 121), carry out the required steps now.

10. Fit flange lid Ⓕ with impressed current anode Ⓗ and earth strap Ⓚ of the impressed current anode. Tighten the screws with a maximum torque of 25 Nm.

    Please note
    Contact between the impressed current anode and the internal indirect coil leads to a failure of the anode. This leads to corrosion damage on the DHW cylinder.
    Test the resistance of the impressed current anode in accordance with the following description.

11. Measure the resistance between connectors Ⓔ and Ⓚ. The resistance must veer towards infinity. If the resistance is significantly lower, carry out a detailed installation check (the anode may contact the indirect coil).

12. Slide anode connector Ⓓ onto push-on tab Ⓔ.

    Note
    Never interchange cables/leads.

13. Install thermal insulation hood Ⓒ.

14. Open shut-off valve Ⓐ (only for the Vitocal 242 internal).

15. Check the fittings on the heating and DHW side for leaks and tighten, if required.

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Further details regarding the individual steps (cont.)

16. Record the work carried out in the commissioning/service report from 216.

Replacing the impressed current anode

1. Dismantle the flange lid in accordance with the steps described from page 118.

2. Install a new impressed current anode into the flange lid.

Installation and operating instructions of the anode manufacturer

3. Bend the impressed current anode in accordance with the pattern of the old anode.

4. Install the flange lid in accordance with the steps described from page 118.

Matching the cylinder volume that can be heated up (only for the Vitocal 242, if required)

If solar collectors are connected to the equipment, we recommend you limit the cylinder volume that can be heated by the **heat pump** in favour of heating by the **solar collectors**.
If this is not required, we recommend the adjustment of the switching times for DHW heating, so that the total cylinder volume will only be enabled for heating in the afternoon of each day.

Operating instructions

According to the factory settings, the complete cylinder volume is available for heating by the heat pump.

Valve position	Heated by the heat pump:
A/AB	total cylinder volume (approx. 250 litres)
B/AB	only the upper cylinder volume (approx. 80 litres)

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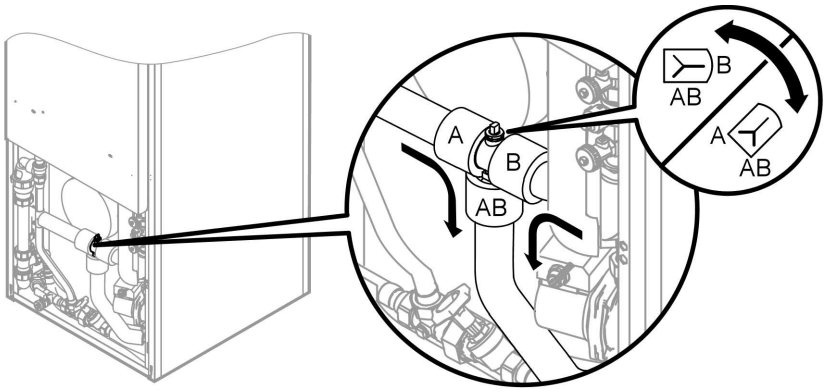
Further details regarding the individual steps (cont.)



1. If required, change over the three-way valve (see Fig.).
2. Change the control settings (see page 169, section "Cylinder volume for heat pump").

Setting the control parameters

1. Activate the "**Contractor level**". For information regarding the "**Contractor level**" and regarding control parameters, see chapter "Control settings" from page 142.
2. Check the control settings using the details regarding standard settings (from page 217). Record only modified values in the service report from page 217.
3. Acknowledge all fault messages (see page 124).

   Note
   In this case, the fault messages are not notifications of equipment faults. These will have been created by the manual control of some equipment components during commissioning.

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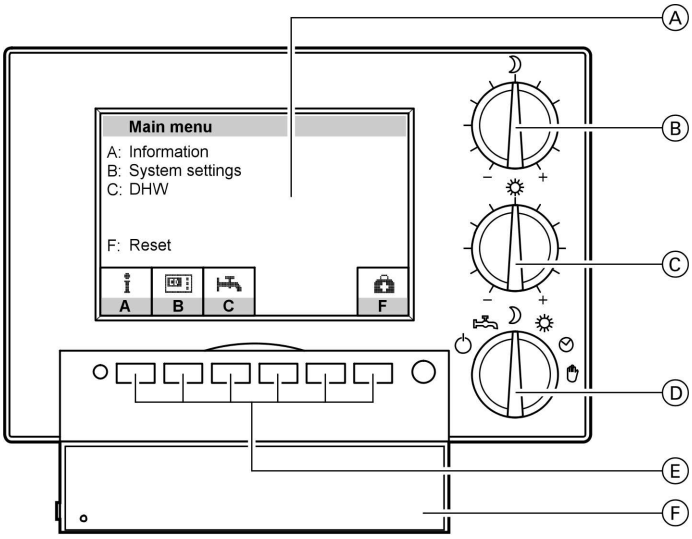
Control unit diagnostics

Programming unit overview



Ⓐ Display
Ⓑ Rotary selector "Reduced room temperature"
Ⓒ Rotary selector "Standard room temperature"
Ⓓ Operating mode selector
Ⓔ Menu keys
Ⓕ Programming unit flap

Fault messages

Internal faults are captured, displayed and saved by the device.
If there are active faults:

- The red LED to the left of the Opto-link interface flashes (Ⓒ in fig. on page 192).
- When the flap of the programming unit is closed, the fault symbol "ϟ" flashes on the display.
- If a Vitotrol 200 remote control is connected, its red fault indicator also flashes.

A maximum of eight faults can be stored.

Control unit diagnostics (cont.)

If more faults than that have occurred, the control unit acts as follows:
- Messages with lower priority will be deleted if there are messages with higher priority (than those already stored).
- In case of messages with the same priority (as those already stored), older messages will be deleted.
- Messages with lower priority (than those already stored) will not be stored.

Active faults are displayed in accordance with their respective priority.

Acknowledging fault messages

Any active fault messages will be displayed after opening the programming unit flap. These can be acknowledged, as soon as their cause has been removed. After acknowledging a fault the control unit checks, whether the fault has been removed. If that is not the case, then the fault will be redisplayed as unacknowledged.

Acknowledged faults remain in the list, until the control unit has recognised that the cause of the fault has been removed.
- Press "**OK**" to acknowledge the highlighted fault message.
- Press "**ALL**" to acknowledge **all** fault messages.

Scanning fault messages

There are two different options for scanning fault messages.

Scanning all fault messages

Menu item
- **"Information"**
- **"Fault messages"**
  The fault messages can be acknowledged as described on page 124.
- **"BACK"**

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Control unit diagnostics (cont.)

Scanning all stored ("historic") fault messages

Menu item
- "**Information**"
- "**Statistics**"
- "**Fault history**"
  – Press "**TIME**", to display the time of the fault occurrence
  – Press "**FAULT**" to return to the fault description.
- "**BACK**"

Note
The fault messages cannot be acknowledged in the fault history.

Skipping fault messages

To enable adjustments/scans at the control unit:

1. Open the programming unit flap. All current fault messages will be displayed.
2. Press "**BACK**".
   The main menu will be displayed. You can now make adjustments and scans.

Displaying fault messages

Note
The sensor resistance curves required for testing the sensors are on page 191.

Fault messages		Cause	Measures
System fault		Control unit processor faulty	Replace the programming unit
10	Outside temperature sensor	Short circuit	Check the sensor and replace, if required
18	Outside temperature sensor	Lead broken	Check the terminals and replace the sensor, if required
20	Sec. flow sensor	Short circuit	Check the sensor and replace, if required
28	Sec. flow sensor	Lead broken	Check the terminals and replace the sensor, if required
30	Primary in sensor	Short circuit	Check the sensor and replace, if required

Control unit diagnostics (cont.)

Fault messages		Cause	Measures
38	Primary in sensor	Lead broken	Check the terminals and replace the sensor, if required
40	Heating circuit 2 flow sensor (mixer circuit)	Short circuit	Check the sensor and replace, if required
44	Natural cooling flow sensor		
48	Heating circuit 2 flow sensor	Lead broken	Check the terminals and replace the sensor, if required
4C	Natural cooling flow sensor		
50	DHW sensor top	Short circuit	Check the sensor and replace, if required
52	DHW sensor bottom		
58	DHW sensor top	Lead broken	Check the terminals and replace the sensor, if required
5A	DHW sensor bottom		
60	Buffer cylinder sensor	Short circuit	Check the sensor and replace, if required
61	Secondary return sensor		
68	Buffer cylinder sensor	Lead broken	Check the terminals and replace the sensor, if required
69	Secondary return sensor		
92	Solar collector sensor	Short circuit	Check the sensor and replace, if required
93	Solar return sensor		
9A	Solar collector sensor	Lead broken	Check the terminals and replace the sensor, if required
9B	Solar return sensor		
A4	Check valve	The check valve is stuck or faulty; the solar circuit circulates during the night	Check the check valve and replace, if required

Control unit diagnostics (cont.)

Fault messages		Cause	Measures
A6	Secondary pump	Secondary pump faulty	Check the secondary pump (see page 113); replace the pump, if required
A7	Solar heating circuit	The solar circuit has no circulation	Check the solar circuit pump (see page 114) and replace it, if required
A8	Pump HC 1	No DHW circulation	Check the external heating circuit pump (see page 114) and replace the pump, if required
A9	Heat pump	Heat pump	Check heat pump (see page 116), primary pump, secondary pump and replace if necessary. The unit goes into reduced mode with the instantaneous heating water heater until the fault message has been acknowledged. After the repair has been carried out, the heat pump starts again only after the equipment was first turned OFF.
EXT	E heater	The flow temperature does not rise; the instantaneous heating water heater may be faulty	Check the high limit safety cut-out and the heater elements; replace, if required
AC	Natural cooling	Faulty function	As part of the relay test (see page 145), check the natural cooling connection extension and the continuity to the pumps
AD	Mixer – heating/DHW	Mixer faulty	Check the mixer (see page 116); replace, if required
AF	Cylinder primary pump	Circulation pump for cylinder heating is faulty	Check the pump (see page 116); replace, if required
B1	KM Communication	Communication error, programming unit	Check connections and replace the programming unit, if required

Control unit diagnostics (cont.)

Fault messages		Cause	Measures
BA	KM BUS mixer HC 2	Communication fault mixer HC 2	Check the extension kit connections; start the extension kit
BB	KM BUS NC mixer	Communication fault natural cooling mixer	
BC	KM BUS FB HC 1	Fault KM BUS remote control; heating circuit 1	Check connections and cables/leads
BD	KM BUS FB HC 2	Fault KM BUS remote control; heating circuit 2	
C1	Power supply/ compressor	The compressor power supply is not OK (e.g. rotational direction, asymmetrical, phase failure). Compressor fuse, main isolator, phase monitor or motor overload faulty	Check the power supply and components; replace, if required
C4	Power-OFF contact	Power-OFF contact enabled longer than 12 h	Check the Power-OFF contact; replace it, if required
C8	Safety chain	Fault at one of the connected components	External safety chain; check connected components and circuits (e.g. brine pressure or jumper)
C9	Refrigerant circuit	HP-LP or hot gas switch	Check the flow and return temperature sensors, test the high pressure (see page 117), check the primary and secondary circuits for pressure and flow rate; ask your local refrigeration engineer to check the heat pump, if required
CA	Primary pump	Primary flow rate too low or none present	Check the primary pump (see page 115); replace, if required
CB	Primary temperature	Primary inlet temperature below its minimum level	Check the brine circuit for flow rate
D0	Impressed current anode	No impressed current	Fill the DHW cylinder completely or check the impressed current anode contacts and the PCB; replace components, if required

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Control unit diagnostics (cont.)

Fault messages		Cause	Measures
D3	Safety chain	Fault at one of the connected components	External safety chain; check connected components and circuits (e.g. brine pressure or jumper)
D5	DHW SHC	Break in jumper X 6.5 – X 6.6	Check any possibly connected switching contact or bridge (connection on the power PCB)
D7	E heating K6	Check the heating elements connected to K6	***Note*** *Ensure the equipment is at zero volt before resetting the high limit safety cut-out.* To restart the system, reset the relevant high limit safety cut-out on the heater rod (for this, press the red button). ***Note*** *The high limit safety cut-outs are located on the front and back of the heater rods; see also the diagram on page 130.*
D8	E heating K7	Check the heating elements connected to K7	
D9	E heating K8	Check the heating elements connected to K8	
DA	Room sensor HC1	Short circuit	Check the sensor and replace, if required
DB	Room sensor HC2		
DD	Room sensor HC1	Lead broken	Check the terminals and replace the sensor, if required
DE	Room sensor HC2		

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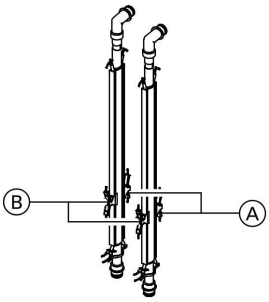
Control unit diagnostics (cont.)



The illustration shows the position of the high limit safety cut-out (Ⓐ: K6, Ⓑ: K7, K8) on the heater rods. For the location of the heater rods, see page 209.

Diagnosis

Measures in case the room temperature is constantly too low

Carry out the following steps to troubleshoot the problem.

1. Increase the set room temperature for standard operation (see operating instructions).
2. Check the outside temperature sensor (see page 112).
3. Adjust the heating curves (see operating instructions).
4. Vent the heating circuit.
5. Hydraulically balance the connected heating circuit(s).
6. Check the flow rate of the heating circuit(s) concerned.
7. Allow heating operation via the integral instantaneous heating water heater (see page 155).

No display in the display field of the programming unit

Carry out the following steps to troubleshoot the problem.

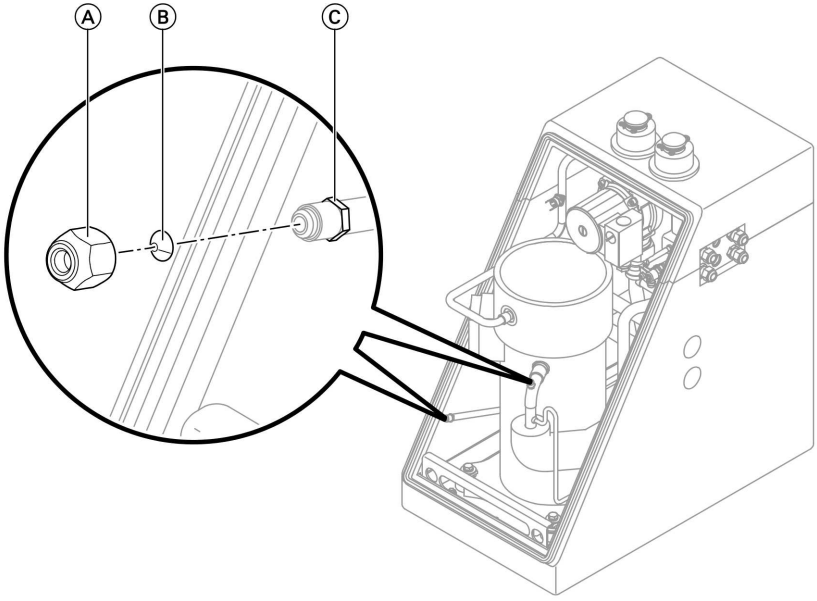
1. Switch the system ON/OFF switch ON (see page 192).
2. Check the fuse; replace it if required (see page 192).

Diagnosis (cont.)

3. Check whether there is voltage at the power feed to the control unit/ electronics; provide power if required.
4. Check the plug-in and threaded connections.
5. Replace the power supply unit.
6. Replace the programming unit.
7. Replace the main PCB.

Refrigerant circuit service valves

Please note
If work on the refrigerant circuit is carried out incorrectly, there is a risk of equipment damage.
The following steps must only be carried out by authorised contractors.



Opening the service valve

When removing the sealing cap Ⓐ counterhold the hexagon Ⓒ with a spanner.

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Diagnosis (cont.)

Closing the service valve

- Use a new copper seal Ⓑ.
- When refitting the sealing cap Ⓐ, counterhold the hexagon Ⓒ with a spanner.
  Required torque: 11 Nm

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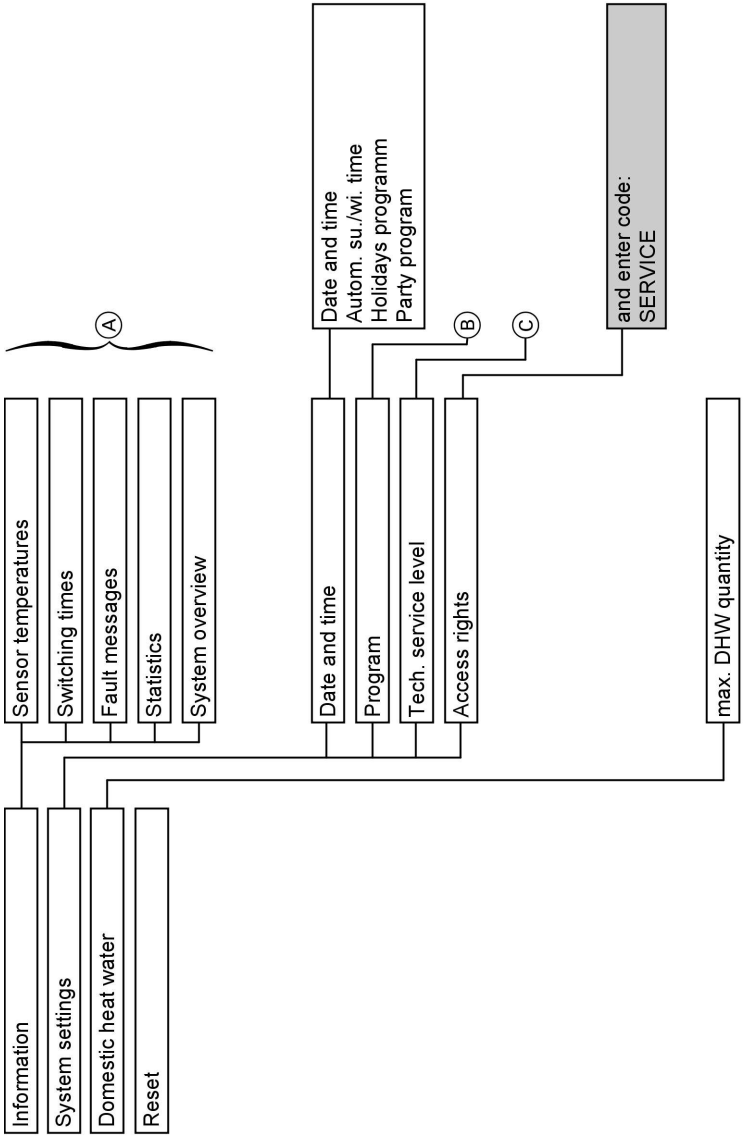
Menu structure overview – Main menu



Ⓐ see page 134

Ⓑ see pages 135, 136 and 137
Ⓒ see pages 138, 139, 140 and 141

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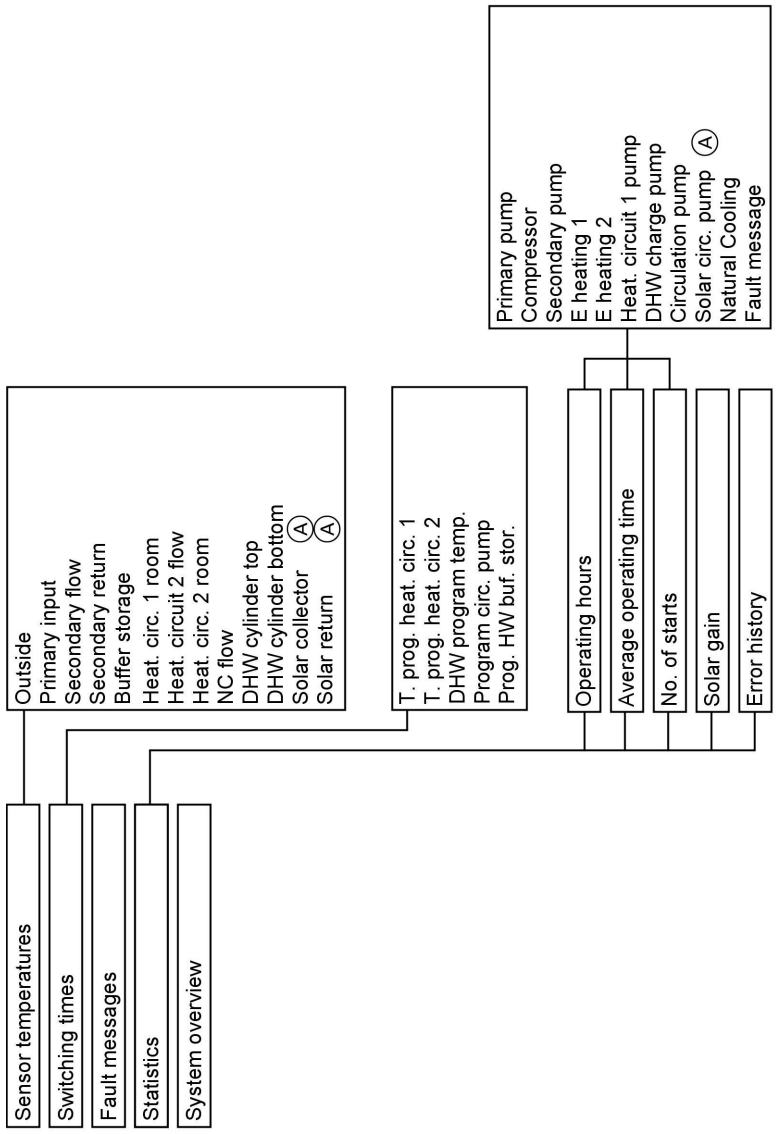
Menu structure overview – information

Main menu > Information



Ⓐ only for the Vitocal 242

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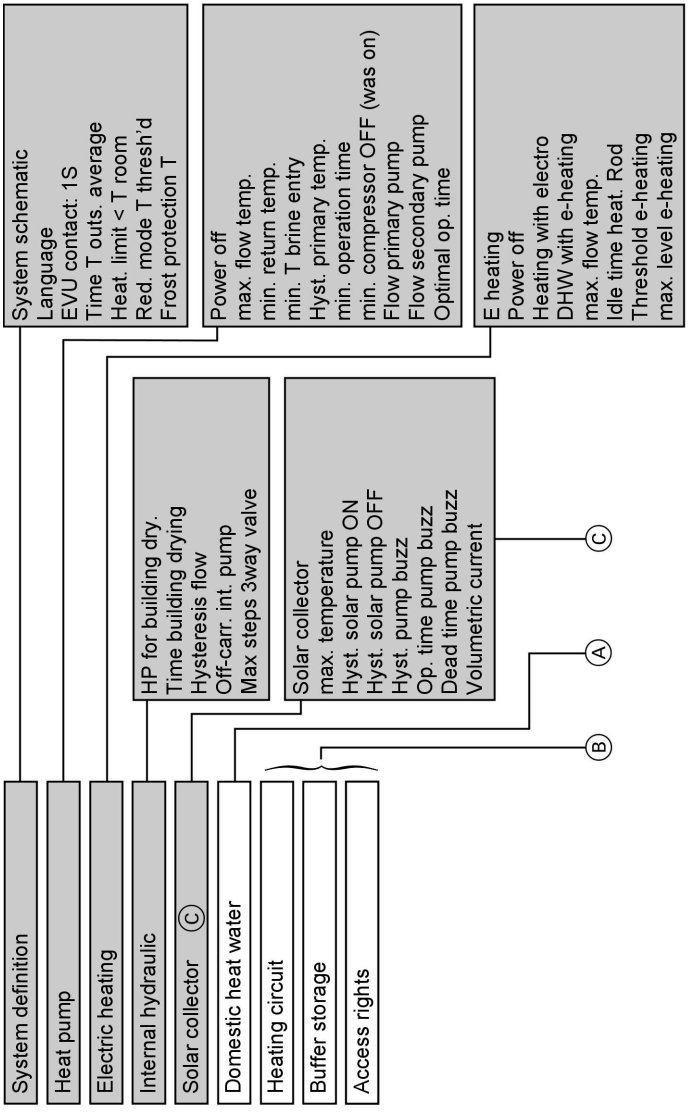
Menu structure overview – Programming

Main menu > Equipment settings > Programming



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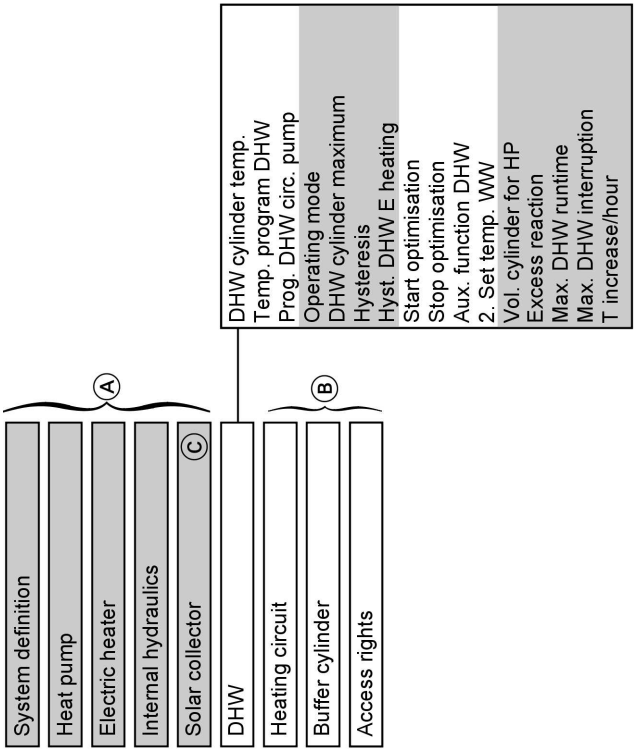
Ⓐ see page 136

Ⓑ see page 137
Ⓒ only for the Vitocal 242

Menu structure overview – Programming (cont.)

Main menu > Equipment settings > Programming



Ⓐ see page 135

Ⓑ see page 137
Ⓒ only for the Vitocal 242

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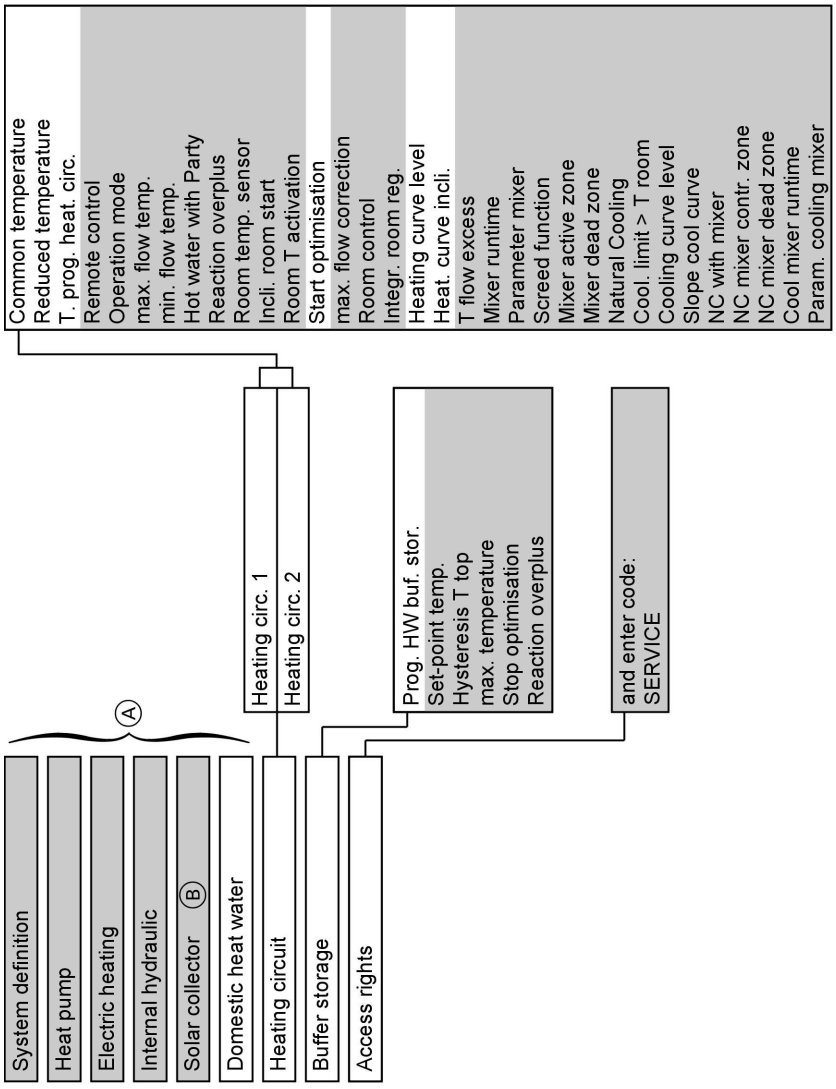
Menu structure overview – Programming (cont.)

Main menu > Equipment settings > Programming

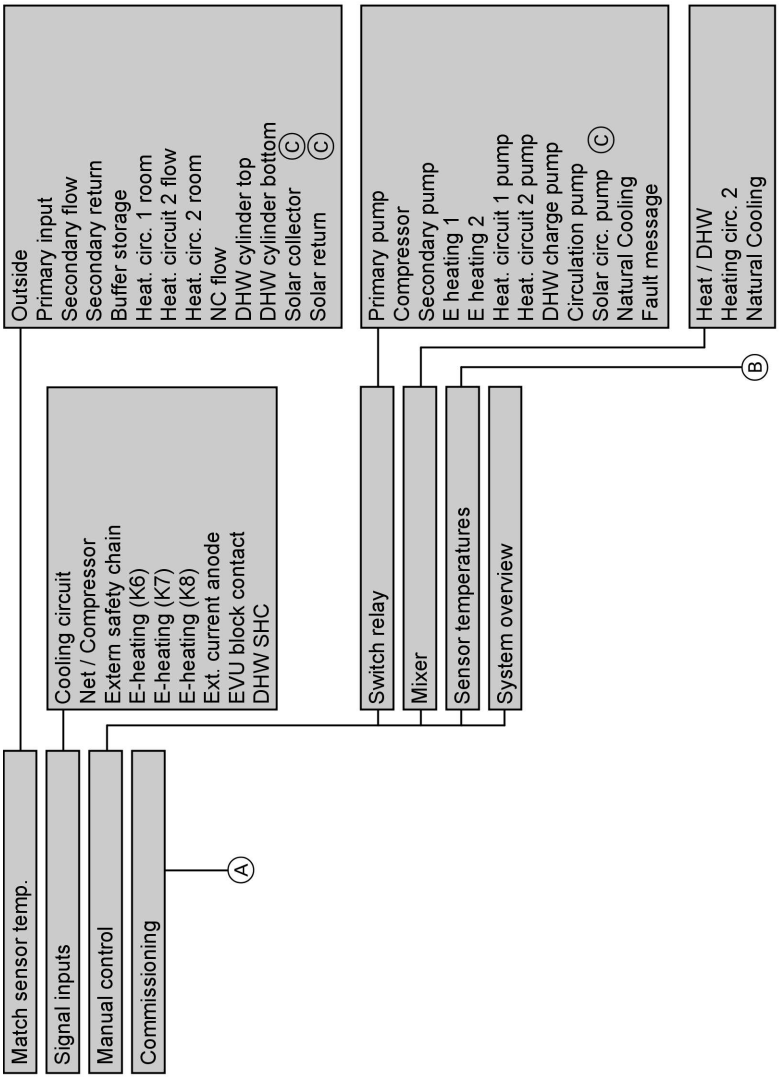


Ⓐ see pages 135 and 136

Ⓑ only for the Vitocal 242

Menu structure overview – Contractor level

Main menu > Equipment settings > Technical service level



Ⓐ see pages 140 and 141

Ⓑ see page 139
Ⓒ only for the Vitocal 242

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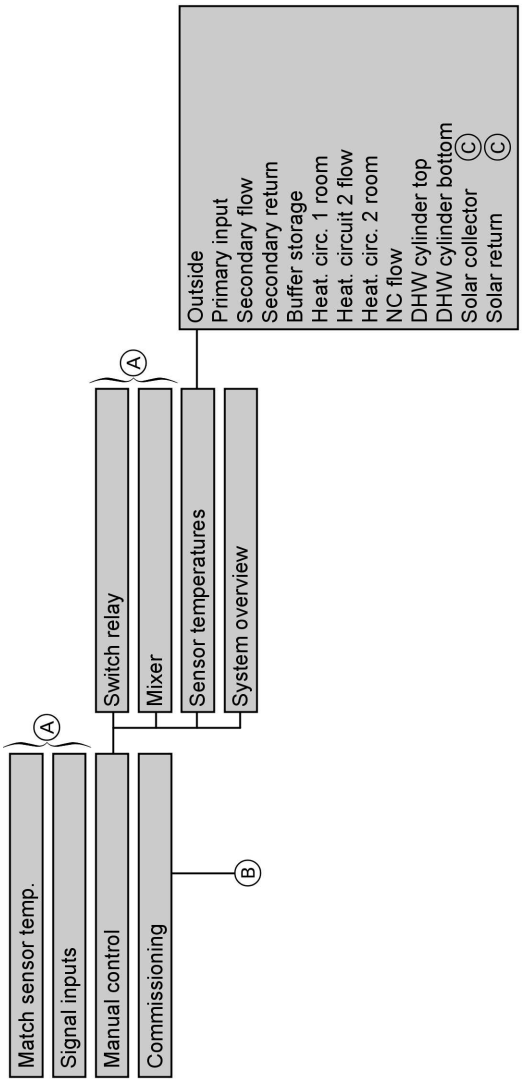
Menu structure overview – Contractor level (cont.)

Main menu > Equipment settings > Technical service level



Ⓐ see page 138

Ⓑ see pages 140 and 141
Ⓒ only for the Vitocal 242

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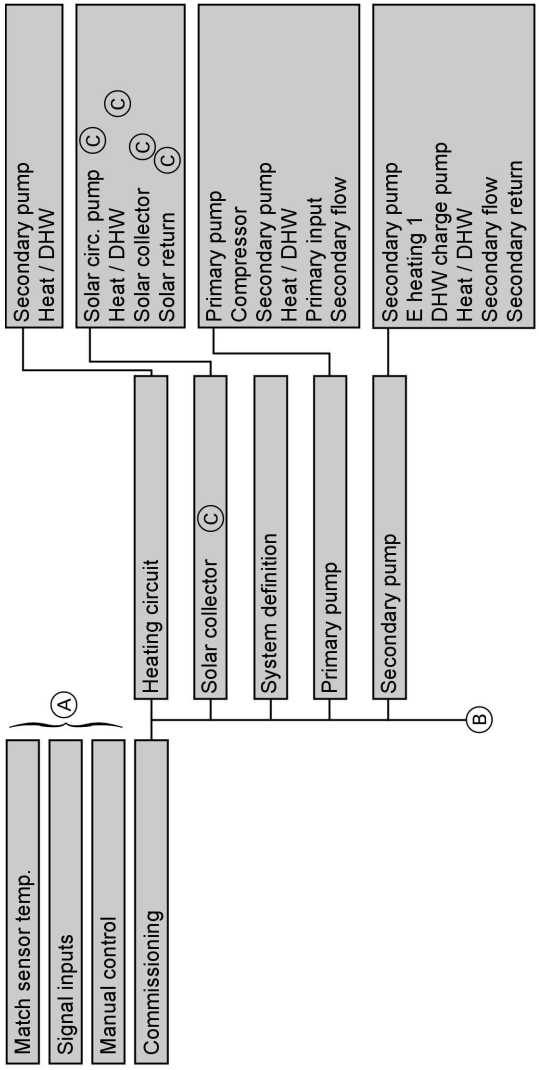
Service

Menu structure overview – Contractor level (cont.)

Main menu > Equipment settings > Technical service level



Ⓐ see pages 138 and 139

Ⓑ see page 141

Ⓒ only for the Vitocal 242

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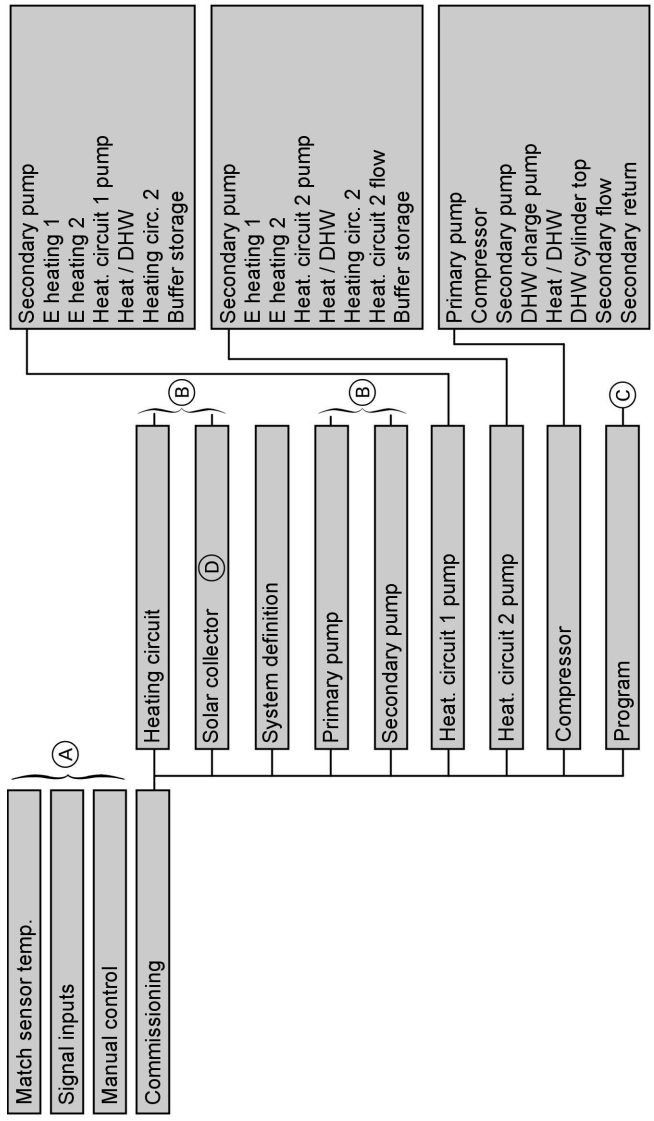
Menu structure overview – Contractor level (cont.)

Main menu > Equipment settings > Technical service level



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Ⓐ see page 138

Ⓑ see page 140

Menu structure overview – Contractor level (cont.)

Ⓒ see pages 135 to 137
Ⓓ only for the Vitocal 242

Control settings by contractors

Only those settings are described on the following pages that are the **exclusive** domain of specialists operating at the contractor level. Enter a code to access the technical service level (see page 142).
Parameters that are explained in the **operating instructions**, are **not** explained here. However, they are listed in the order in which they appear in the control menu.

Note
Incorrect operation at the technical service level by system users will invalidate our warranty.

The description of the control settings is structured as follows:
- Descriptions of the "**Technical service level**" menu (see also pages 138 and 139) are listed on pages 142 to 145.
  This section has the header headline "Control settings".
- The settings in the "**Programming**" menu (see also pages 135 and 136) are described on pages 147 to 189.
  The header includes the descriptions of the individual sub-menus ("**System definition**", "**Heat pump**" etc.) ("Control settings system definition" etc.).

Activating the technical service level

Note
Incorrect operation at the technical service level by system users will invalidate our warranty.

1. Open the programming unit flap.

Activating the technical service level (cont.)

2. Enter code:

Menu item
- **"Device settings"**
- **"Access rights"**
- Enter code: SERVICE
  press each 1 x

- 2 x **"OK"**

Note
Access to the technical service level is blocked if the programming unit flap is closed or the standard display key is pressed.
The code needs to be re-entered if additional adjustments are to be made at the technical service level.

Adjusting sensor temperatures

Sensor deviations caused by differing line resistances can be compensated for using this function.
Data is saved even during power failures.

Menu item
- **"Device settings"**
- **"Contractor level"**
- **"Adjust sensor temp."**
  Enter current temperature measurement for each sensor.
  Pressing **"RESET"** reverses the adjustment entered for the highlighted sensor.
- **"OK"**

Checking signal inputs

The system can be checked using this menu. For example, in case of a fault, you can check whether the cause has been removed. This check can only be carried out with the relay switched OFF.
In standard mode, all monitoring inputs are "**OFF**". In case of a fault, they change into the "**ON**" condition.
Any changes into the "**ON**" condition are saved and will be displayed in the menu "**Information**" > "**Statistics**" > "**Fault history**".
An exception is the display in case of "**power-OFF contact**". If the power-OFF contact operates as an N/O contact (see page 147), "**On**" means that power-OFF is active. If the power-OFF contact operates as an N/C contact (see page 147), "**Off**" means that the power-OFF is active.

Menu item
- "**Device settings**"
- "**Contractor level**"
- "**Signal inputs**"
- "**BACK**"

Manual control of relays and mixers

The "manual control" facility can be used to switch the relays and mixers (generic term: "actuators") for starting or testing individual components.
All control functions are disabled as long as the "**Manual control**" menu or one of its sub-menus is called up.
All actuators are exclusively moved by hand, as long as the programming unit flap is open.
Upon leaving the "**Manual control**" menu (e.g. by closing the programming unit flap), all actuators that are currently not required for standard control mode, are switched off by the control unit, and the control sequences are restarted.

Menu item
- "**Device settings**"
- "**Contractor level**"
- "**Manual control**"

The following sub-menus are available from the "**Manual control**" menu:

Menu item
- "**Relay**"
- "**Mixer**"
- "**Sensor temperatures**"
- "**System overview**"

The sub-menus "**Sensor temperatures**" and "**System overview**" can also be called up from the main menu via "**Information**". For further information regarding the sub-menus, see the operating instructions.

Manual control of relays and mixers (cont.)

"Relay" sub-menu

Note
Here, the relays can be activated at random.
Some actuators may still be switched ON when this menu is called up.

! **Please note**
Unintentional conflicting operating situations can be created using "manual control" (e.g. "**E heating 1: On**" and "**secondary pump: Off**"). This can lead to equipment damage.
For this reason, first set **all** actuators to "**Off**" during every operating procedure, then set the **required** actuators to "**On**".

! **Please note**
If the intervals between manually switching the compressor off and on again are too short, the compressor and the full wave soft starter may be damaged.
After switching the compressor off, wait for at least 10 minutes before switching it on again.

Menu item
- "**Device settings**"
- "**Contractor level**"
- "**Manual control**"
- "**Relay**"
  – The "**RESET**" key switches all relays OFF, that are currently switched ON.
  – Select a relay by pressing ↑ and ↓, then switch the relay with the keys "**ON**" and "**OFF**".
- "**OK**"

"Mixer" sub-menu

The motors for the internal and external mixers (max. 3) can be manually adjusted here.

Valve position in %	Three-way valve Heating/DHW (internal)	3-way mixer Heating circuit 2 (mixer circuit)	3-way mixer "Natural cooling"
0	Heating	closed	closed
50	Heating/DHW	—	—
100	DHW heating	open	open

Menu item
- "**Device settings**"
- "**Contractor level**"
- "**Manual control**"

Manual control of relays and mixers (cont.)

■ **"Mixer"**
– Select a mixer by pressing [↑] and [↓], then select the required mixer position in % using the keys [+1%]/[–1%].
– Key [0%] puts the mixer in its zero position.

■ **"OK"**

System design

As well as the procedure described in "system configuration" (see page 109), the system design can be modified at this point or additional components and/or functions selected or deselected.

Access
- "**Device settings**"
- "**Programming**"
- "**System definition**"
- **"System scheme"**

The required procedure is described from page 109.

Power-OFF contact: 1S

This setting determines whether the power-OFF contact acts as N/O ("**YES**") or N/C ("**NO**") contact.

Access
- "**Device settings**"
- "**Programming**"
- "**System definition**"
- **"Power-OFF contact: 1S"** ("**YES**", "**NO**")

Standard setting NO
Setting range YES/NO

Average time; outside temperature

This parameter determines the filtering of the outside temperature by a time constant of 22 hours (standard setting). This compensates for short-term temperature fluctuations.

Access
- "**Device settings**"
- "**Programming**"
- "**System definition**"
- **"Ave. time outside temp."** (**–10** / **+10**)

Standard setting 22:00 h
Setting range 00:10 to 100:00 h

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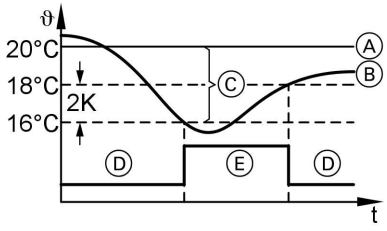
Heating limit < T room (heating limit temperature)

The heating limit temperature defines the value of the outside temperature below which central heating commences.
The heating limit temperature is the result of the selected set room temperature less the value entered under "**Heating limit < T room**".
Example:
The selected set room temperature is 20 °C, the value entered under "**Heating limit < T room**" is 4.0 K.
Central heating commences if the average outside temperature drops below 16 °C (heating limit temperature).
If the outside temperature exceeds 18 °C, central heating is adjusted because of the specified hysteresis of 2 K.



Access
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Heating limit < T room"** (+1,0 / –1,0)

Standard setting	4 K
Setting range	0 to 20 K

Ⓐ Set room temperature
Ⓑ Outside temperature
Ⓒ Selected value "**Heating limit < T room**"
Ⓓ Heating OFF
Ⓔ Heating ON

Temperature limit for reduced temperature mode

The "**reduced**" temperature mode (see operating instructions) will no longer be used, if the average outside temperature falls **below** the temperature limit selected here. The equipment heats up to the temperature selected for standard operation.
Operation will continue in accordance with the selected switching times, if the average outside temperature stays **above** this temperature limit.

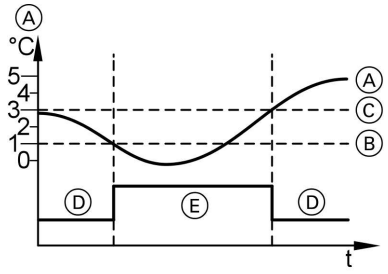
Temperature limit for reduced temperature mode (cont.)

Access
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Temperature limit for red. BA"** (+1,0 / -1,0)

Standard setting	-30 K
Setting range	-30 to +30 K

Frost protection temperature

The equipment enters reduced mode to protect itself against frost, as soon as the average outside temperature drops below this value. This will be implemented independent of the setting of the operating mode selector.
The OFF point of the frost protection is set 2 K higher than the ON point.



Ⓐ Outside temperature
Ⓑ Frost protection temperature (can be selected)
Ⓒ Frost protection OFF point (frost protection temperature + 2 K)
Ⓓ Reduced heating mode OFF
Ⓔ Reduced heating mode ON

Access
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Frost protection T"** (+1,0 / -1,0)

Standard setting	1 °C
Setting range	-15 to +15 °C

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Power-OFF compressor

With activated power-OFF ("**power-OFF: YES**") the power supply utility can switch off the **heat that is being generated** by the **heat pump**. This requires that the power-OFF contact has been connected (see page 71).
The **heat distribution** by the heating circuit pump and the circulation pump for cylinder heating are not affected by the power interruption.
If power-OFF has been activated, a buffer cylinder must be installed to cover the periods during which no heat can be generated.

Note
*The effect of the power interruption on the **instantaneous heating water heater** is determined separately (see page 155).*

Access
- **"Device settings"**
- **"Programming"**
- **"Heat pump"**
- **"Power-OFF"** (**"YES"**/**"NO"**)

Standard setting	YES
Setting range	YES/NO

Maximum flow temperature

Setting the maximum heat pump flow temperature.

Access
- **"Device settings"**
- **"Programming"**
- **"Heat pump"**
- **"Max. flow temp."** (+1,0/–1,0)

Standard setting	60 °C
Setting range	25 to 60 °C

Minimum return temperature

Not the heat pump but the instantaneous heating water heater is started when the actual temperature drops below the minimum return temperature.
The instantaneous heating water heater stays ON until the minimum return temperature has been achieved.

Minimum return temperature (cont.)

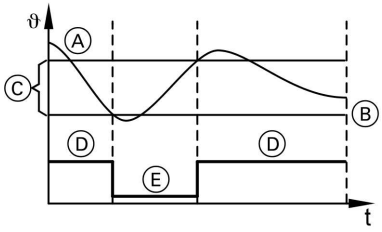
Note
If the minimum return temperature has been set too low, there is more compressor wear due to the increase in the number of low-pressure shutdowns.
If the minimum return temperature is set too high, the proportion of electrical heating increases and the degree of efficiency drops. This problem occurs primarily when heating up a cold building.

Access
- **"Device settings"**
- **"Programming"**
- **"Heat pump"**
- **"Min. return temp."** (+1,0/–1,0)

Standard setting	5 °C
Setting range	1 to 40 °C

Hysteresis T primary/min. T primary in

This setting determines the control range for starting and stopping the heat pump. The shutdown point of the heat pump is determined by the minimum brine entry temperature ("**Min. T primary in**").



Access
- **"Device settings"**
- **"Programming"**
- **"Heat pump"**
- **"Hyst. T primary"**
  or
  "Min. T primary in" (+1,0/–1,0)

Ⓐ Brine inlet temperature
Ⓑ **"Min. T primary in"**
Ⓒ **"Hysteresis T brine"**
Ⓓ Heat pump ON
Ⓔ Heat pump OFF

	Standard setting	Setting range
"Hyst. T primary"	5 K	1 to 20 K
"Min. T primary in"	-4 °C	-10 to +20 °C

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Minimum runtime

Setting the minimum heat pump runtime. The heat pump only switches off when this time has elapsed.
This setting is designed to reach long heat pump runtimes to achieve high efficiency and low wear.

Access
- **"Device settings"**
- **"Programming"**
- **"Heat pump"**
- **"Minimum runtime"** (+10/–10)

Standard setting 2:00 min
Setting range 2:00 to 30:00 min

Min. compressor off

Setting the time that the compressor remains off before it can be restarted. This protects the heat pump from overload conditions (3 starts per hour are the maximum).

Access
- **"Device settings"**
- **"Programming"**
- **"Heat pump"**
- **"Min. compressor off"** (+10/–10)

Standard setting 10:00 min
Setting range 00:20 to 30:00 min

Flow; primary/secondary pump

When the compressor starts, the following conditions must already be met:
- The primary pump must already be running, to enable the primary circuit to circulate brine.
- The secondary pump must already be running, to enable the heat to be transferred immediately via the heating water.

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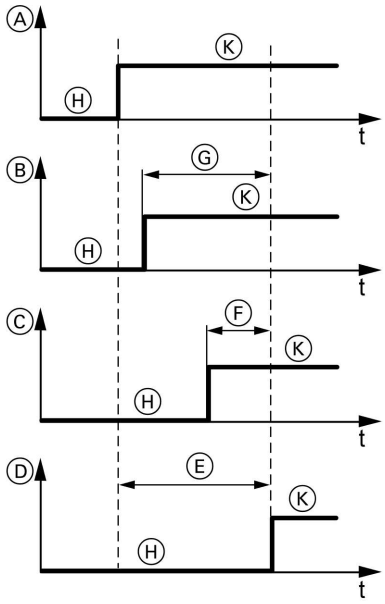
Flow; primary/secondary pump (cont.)



Access
- **"Device settings"**
- **"Programming"**
- **"Heat pump"**
- **"Primary pump flow"**
  or
  "Flow sec. pump" (+10 / –10)

Standard setting	2:00 min
Setting range	00:10 to 16:40 min

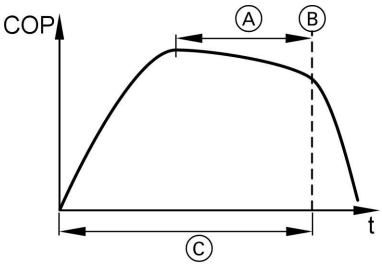
Ⓐ Heating command
Ⓑ Primary pump
Ⓒ Secondary pump
Ⓓ Compressor
Ⓔ Start delay
Ⓕ Secondary pump flow
Ⓖ Primary pump flow
Ⓗ OFF
Ⓚ ON

Optimum runtime

Setting the optimum heat pump runtime. Excessive runtimes (subject to the primary circuit layout) can lead to the geothermal probe icing up, which reduces the efficiency (COP).

5592 969 GB

Optimum runtime (cont.)



Access
- **"Device settings"**
- **"Programming"**
- **"Heat pump"**
- **"Optimum runtime"** (+10 / –10)

Standard setting	2:00 h
Setting range	00:20 to 24:00 h

Ⓐ Optimum operating range
Ⓑ Primary temperature drop
Ⓒ Optimum runtime

5592 969 GB

E heating

This parameter informs the equipment as to whether an instantaneous heating water heater is installed.

Note
Never *modify this parameter. The use of the electric immersion heater for DHW heating and central heating can only be enabled or disabled via parameter* ***"WW with electric heater"*** *and* ***"Heating with electric heater"*** *(see the following pages).*

Access
- **"Device settings"**
- **"Programming"**
- **"Electric heater"**
- **"E heating"** (**"YES"**/**"NO"**)

Standard setting YES
Setting range YES/NO

Power-OFF; instantaneous heating water heater

This setting defines whether the power supply utility can shut off the power supply to the instantaneous heating water heater using a special control unit (setting: **"YES"**). This requires that the power-OFF contact has been connected (see page 71).
If the power supply utility is not to have this facility, select **"NO"**.

Access
- **"Device settings"**
- **"Programming"**
- **"Electric heater"**
- **"Power-OFF"** (**"YES"**/**"NO"**)

Standard setting YES
Setting range YES/NO

Electric heating

This setting enables or disables the boosting of the heating circuits by the instantaneous heating water heater.

Electric heating (cont.)

Access
- **"Device settings"**
- **"Programming"**
- **"Electric heater"**
- **"Heating with electric power"** (**"YES"**/**"NO"**)

Standard setting: YES
Setting range: YES/NO

DHW with electric power

This function makes it possible to deactivate DHW heating by the integral instantaneous heating water heater (e.g. if the water is subsequently heated by an on-site instantaneous heating water heater).
The instantaneous heating water heater then only affects the heating circuit.

Access
- **"Device settings"**
- **"Programming"**
- **"Electric heater"**
- **"DHW with electric power"** (**"YES"**/**"NO"**)

Standard setting: YES
Setting range: YES/NO

Maximum flow temperature

This determines the maximum flow temperature provided by the instantaneous heating water heater.

Access
- **"Device settings"**
- **"Programming"**
- **"Electric heater"**
- **"Max. flow temp."** (+1,0/–1,0)

Standard setting: 65 °C
Setting range: 5 to 75 °C

5592 969 GB

Heater rod delay

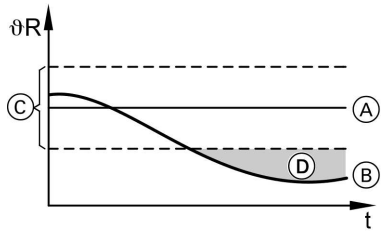
Adjustment of the time during which the electric heating is **not** switched ON after changing the operating mode (reduced/standard).

Access
- **"Device settings"**
- **"Programming"**
- **"Electric heater"**
- **"Heater rod delay"** (+10 / –10)

Standard setting	0:30 h
Setting range	0:00 to 5:00 h

Electric heating threshold

This setting determines, after what "value" (integral comprising the duration and level of a temperature deviation from the set control temperature) the electric heating is switched ON. Brief temperature deviations will not cause the electric heating to be switched ON.



Ⓐ Set control temperature
Ⓑ Actual temperature
Ⓒ "**Hysteresis flow**" (see page 160)
Ⓓ "Value" (integral comprising the duration and level of a temperature deviation)

Access
- **"Device settings"**
- **"Programming"**
- **"Electric heater"**
- **"E heating threshold"** (+10 / –10)

Standard setting	300 K · min
Setting range	10 to 30000 K · min

5592 969 GB

Maximum stage; electric heater

This setting determines, with what output (stage 1, 2 or 3, see from page 222) DHW and heating water will be boosted.

Access
- **"Device settings"**
- **"Programming"**
- **"Electric heater"**
- **"Max. stage E heating"** (+1 / –1)

Standard setting	3
Setting range	1 to 3

5592 969 GB

Heat pump for drying buildings

This setting determines whether the heat pump is used to dry the building as well as the instantaneous heating water heater.
This function must be set to "**NO**" if the heat pump is not ready for operation because the heat pump primary circuit is not ready when building drying takes place.

Access
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"HP for drying buildings"** (**"YES"**/**"NO"**)

Standard setting: NO
Setting range: YES/NO

Time for drying buildings

Selection of the number of days, during which the system for drying buildings is to be used with the instantaneous heating water heater.
Heating will be implemented in accordance with the settings for set temperature and switching times for standard and reduced mode (see operating instructions).
The "**0**" setting switches this function OFF.
The remaining days for drying buildings will be shown on the display when the programming unit flap is closed.

Note
*If the **"Screed function"** (see page 180) has been activated, no intervention must occur here.*
*The settings under **"Screed function"** are directly related to this setting. The settings of both functions influence each other.*
The respective settings under menu point "Heat pump for drying a building" (aforementioned) must be selected, if the heat pump as well as the instantaneous water heater is to be used for drying out the building.

Access
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"Time drying buildings"** (**+01**/**–01**)

Standard setting: 0 (function "OFF")
Setting range: 0 to 30 days

Flow hysteresis

The set flow temperature of the secondary circuit is determined by the control unit in accordance with the current heat demand.
The "**Flow hysteresis**" setting defines the difference from an internally calculated set flow temperature at which one of the heat generators (heat pump, solar collector, instantaneous heating water heater) is switched ON and OFF.

Access
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"Flow hysteresis"** (+0,1/–0,1)

Standard setting	2 K
Setting range	0.5 to 5.0 K

Internal pump run-on

Secondary pump run-on, after the heat generation by the heat pump or the instantaneous heating water heater has been stopped.

Access
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"Int. pump run-on"** (+10/–10)

Standard setting	02:00 min
Setting range	00:10 to 05:00 min

Max. steps; three-way valve

Subject to the type of the three-way valve, the number of step pulses varies that the motor requires to drive the valve from one end stop to the opposite one.
This parameter will only need to be adjusted if the three-way valve has been replaced.
In the delivered condition, the number of step pulses is correctly adjusted.

Note
To activate the modified settings, first switch the system OFF and then ON again at the system ON/OFF switch.

Max. steps; three-way valve (cont.)

Access
- **"Device settings"**
- **"Programming"**
- **"Heat pump"**
- **"Max. step 3-way valve"** (+1 / –1)

Standard setting	320
Setting range	do not change

5592 969 GB

Solar collector

Any installed solar collector must be enabled in the control unit. A number of other parameters that must be defined to make the integral solar control unit operate accurately can be retrieved at this point.

Note
If the solar collector has already been enabled under "System configuration" (see page 109) or "System design" (see page 147), it will also be enabled under this menu item (set to "YES").

Access
- **"Device settings"**
- **"Programming"**
- **"Solar collector"**
- **"Solar collector"** (**"YES"**/**"NO"**)

Standard setting: NO
Setting range: YES/NO

Maximum temperature

Setting of the maximum collector temperature. The solar circuit pump is switched OFF when this value is exceeded.

Access
- **"Device settings"**
- **"Programming"**
- **"Solar collector"**
- **"Max. temperature"** (+5,0/−5,0)

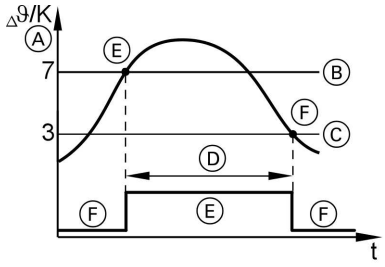
Standard setting: 130 °C
Setting range: 100 to 300 °C

Solar pump hysteresis ON/solar pump hysteresis OFF

This setting determines, at what temperature differential between the solar collector and the DHW cylinder the solar circuit pump is switched ON or OFF.

5592 969 GB

Solar pump hysteresis ON/solar pump hysteresis . . . (cont.)



Access
- **"Device settings"**
- **"Programming"**
- **"Solar collector"**
- **"Hyst. solar circuit pump ON"**
  or
  "Hyst. solar circuit pump OFF"
  (+0,1/–0,1)

Ⓐ Temperature differential solar collector/cylinder (cylinder colder)
Ⓑ Start hysteresis
Ⓒ Stop hysteresis
Ⓓ Solar circuit pump switching time
Ⓔ Solar circuit pump ON
Ⓕ Solar circuit pump OFF

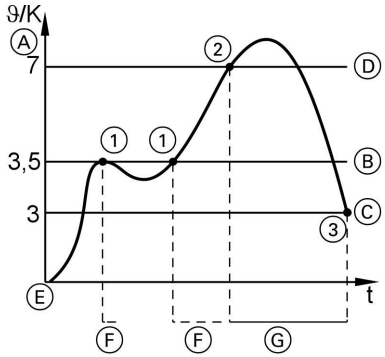
	Standard setting	Setting range
"Hyst. solar circuit pump ON"	7.0 K	3.0 to 20.0 K
"Hyst. solar circuit pump OFF"	3.0 K	1.0 to 15.0 K

Pump kick hysteresis

This setting determines, in what differential temperature range between the solar collector and cylinder water the solar circuit pump starts and stops **in intervals**.
Through an improved feed, this function safeguards optimum temperature capture by the collector temperature sensor.

5592 969 GB

Pump kick hysteresis (cont.)



At ①, the solar circuit pump is started for the time defined as pump kick runtime (see page 164). If the temperature continues to increase to the ② (**"Hyst. solar circuit pump ON"**) point, the solar circuit pump runs continuously until the stop hysteresis is reached (**"Hyst. solar circuit pump OFF"**) ③ (see also page 162).

Ⓐ Temperature differential solar collector/cylinder (cylinder colder)
Ⓑ Pump kick start hysteresis
Ⓒ Solar circuit pump stop hysteresis
Ⓓ Solar circuit pump start hysteresis (standard mode)
Ⓔ Solar circuit pump operating state
Ⓕ Solar circuit pump interval mode (pump kick runtime/dead time)
Ⓖ Uninterruptible solar circuit pump operation

Access
- **"Device settings"**
- **"Programming"**
- **"Solar collector"**
- **"Pump kick hysteresis"** (+0,1/–0,1)

Standard setting	3.0 K
Setting range	3.0 to 20.0 K

Pump kick runtime

Solar circuit pump kick runtime (see page 163).

Access
- **"Device settings"**
- **"Programming"**

Pump kick runtime (cont.)

- **"Solar collector"**
- **"Pump kick runtime"**
  (**+1**/**–1**)

Setting range 00:01 to 00:20 min

Standard setting 00:02 min

Pump kick dead time

Time, inside of which the solar circuit pump cannot start after a pump kick (see page 163).

Access
- **"Device settings"**
- **"Programming"**
- **"Solar collector"**
- **"Pump kick dead time"**
  (**+30**/**–30**)

Standard setting 01:00 min
Setting range 01:00 to 60:00 min

Flow rate

Flow rate entry in system collector circuit.
Entering this value from the basis for the solar yield calculation. The flow rate is calculated from the selected pump rate of the solar circuit pump and the pressure drop in the connection line and the solar collectors.

Access
- **"Device settings"**
- **"Programming"**
- **"Solar collector"**
- **"Flow rate"**
  (**+**/**–**)

Standard setting 100 l/h
Setting range 10 to 500 l/h

5592 969 GB

DHW cylinder temperature

Operating instructions

DHW program temperature

Operating instructions

DHW circulation pump program

Operating instructions

Operating mode

Determining the DHW cylinder operating mode.

Setting	Function
Standby	Equipment frost protection
Reduced	The control only responds to the upper cylinder temperature sensor; the cylinder stores approx. 80 litres of DHW.
Standard	The control responds to the upper and lower cylinder temperature sensor; the cylinder stores approx. 220 litres of DHW.*1
Fixed value	Operation as fixed value controller with set DHW temperature 2.
Rotary selector	The settings of the operating mode selector, the programmed switching times and the settings of the remote control are taken into account (standard setting).
External	no function
Switching times	Only the settings made in conjunction with the programmed switching times are taken into consideration.

Access
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Operating mode"** (**<<**/**>>**)

5592 969 GB

*1 *This setting is only effective if the three-way valve is set to A/AB (see page 121).*

DHW cylinder maximum

Setting of the maximum temperature inside the DHW cylinder.
Renewed heating will be prevented after this temperature has been reached, until the temperature has dropped at least by 5 K.

Note
Increase this value to 70 °C when using solar collectors.

Danger
DHW temperatures > 60 °C can lead to scalding.
At these temperatures, install anti-scalding protection on site.

Access
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"DHW cylinder maximum"**
  (+5,0/–5,0)

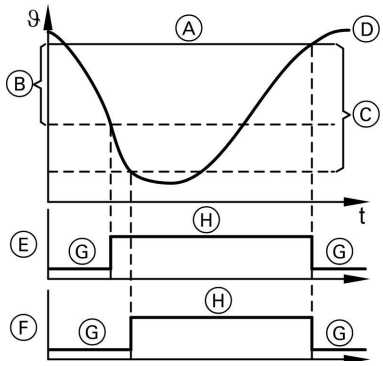
Standard setting	60 °C
Setting range	20 to 80 °C

Hysteresis; DHW instantaneous heating water heater/hysteresis

These settings determine the deviation from the set DHW cylinder temperature ("**DHW cylinder temp.**") at which the cylinder heating is switched on and off by the heat pump ("**Hysteresis**").
If an instantaneous heating water heater is also installed, the "**DHW E heating hysteresis**" is also relevant.

5592 969 GB

Hysteresis; DHW instantaneous heating water . . . (cont.)



Ⓐ Set DHW temperature
Ⓑ Heat pump switching hysteresis ("**Hysteresis**")
Ⓒ Instantaneous heating water heater switching hysteresis ("**Hysteresis; DHW E heating**")
Ⓓ Actual DHW temperature at the upper cylinder temperature sensor
Ⓔ Heat pump control state
Ⓕ Control state, instantaneous heating water heater
Ⓖ OFF
Ⓗ ON

Note
*The value selected for "**Hysteresis**" should be higher than the expected temperature drop due to heat losses in a single night (approx. 5 K).*
*A lower value for "**Hysteresis DHW E heating**" increases the proportion of electrical DHW heating, i.e. the system efficiency drops.*

Access
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Hysteresis"**
  or
  "Hysteresis; DHW E heating"
  (+0,5/−0,5)

	Standard setting	Setting range
"Hysteresis"	7.0 K	1.0 to 10.0 K
"Hysteresis; DHW E heating"	10.0 K	2.0 to 30.0 K

5592 969 GB

Start optimisation

Operating instructions

Stop optimisation

Operating instructions

DHW auxiliary function

Operating instructions

Set DHW temperature 2

Operating instructions

Heat pump cylinder volume

The available cylinder volume can be varied via a manually controlled three-way valve (see page 121).
Only this adjustment provides a feedback to the control unit via the setting of the manual valve and therefore the cylinder volume, which can be heated.

Note
*The entire contents of the cylinder can only be heated if the manual valve has been set accordingly **and** for **"Cylinder volume for HP"** the setting **"YES"** has been selected.*

Access
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Vol. cylinder for HP"** ("YES"/"NO")

Standard setting	YES
Setting range	YES/NO

5592 969 GB

Excess reaction

Coordination of the heat drawn off in the secondary circuit when the heat pump produces an excess of heat or the heat drawn by the secondary circuit is suddenly choked off.

Settings:

0	No heat drawn off
1	Heat will be drawn off only in case of a critical excess, i.e. if critical temperatures were reached in the heat pump circuit or the minimum heat pump runtime has not yet been reached.
2	Heat will be drawn off, even if the excess heat being created is not critical for the heat pump.

Access
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Excess reaction"** (+1/–1)

Standard setting 2
Setting range 0 to 2

Maximum DHW runtime

This value determines the time during which the DHW cylinder will be heated. However, this only applies in case of a simultaneous heat demand from the heating circuit. Should the heating circuit not require any heat, then the DHW cylinder will be heated beyond this time until the selected DHW cylinder temperature has been reached (see operating instructions).

Access
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Max. DHW runtime"** (+10/–10)

Standard setting 04:00 h
Setting range 00:10 to 24:00 h

Maximum DHW interruption

The value set here determines the period, during which the heating circuit can be heated. If heat is still being requested from the heating circuit after this time has elapsed, the DHW cylinder is initially heated in spite of this (if necessary).

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Maximum DHW interruption (cont.)

Access
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Max. DHW interruption"**
  (+10 / –10)

Standard setting	01:30 h
Setting range	00:10 to 24:00 h

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Standard temperature

Operating instructions

Reduced temperature

Operating instructions

Temperature program, heating circuit

Operating instructions

Remote control

If a remote control is installed, it must be activated for the relevant heating circuit.

Note
*If a remote control is used, set the "**Operating mode**" parameter (see page 172) to "**Remote control**". Otherwise the fault indicator will flash on the remote control.*
The remote control must also be programmed for the corresponding heating circuit. For more information on the use of room temperature sensors and remote controls, see page 66.

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Remote control"** (**"YES"**/**"NO"**)

Standard setting	NO
Setting range	YES/NO

Operating mode

You can set a fixed operating mode here that will take priority over the operating mode selected at the operating mode selector.

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Operating mode (cont.)

Setting	Function
Standby	Equipment frost protection
Reduced	Constant reduced room temperature
Standard	Constant standard room temperature
Fixed value	Operation as fixed value controller
Rotary selector	The operating mode is selected via the operating mode selector (standard setting)
External	no function
Switching times	Operation in accordance with selected switching times
Remote control	Operation in accordance with the remote control settings. This setting can only be selected if the remote control was activated beforehand (see page 172).

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Operating mode"** (**<<** / **>>**)

Maximum flow temperature

Limiting the heating circuit flow temperature to a maximum value. The lowest available value represents the setting of the temperature at "**min. flow temp.**". (see page 173).

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Max. flow temp."** (**+1,0** / **-1,0**)

Standard setting	40 °C
Setting range	10 to 70 °C

Minimum flow temperature

Limiting the heating circuit flow temperature to a minimum value. The highest available value represents the setting of the temperature at "**Max. flow temp.**".

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Minimum flow temperature (cont.)

Note
*This setting influences the natural cooling function. If the setting is **too low**, the dew point monitor switches the cooling function off prematurely, subject to the cooling curve (see page 173).*

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Min. flow temp."** (+1,0/–1,0)

Standard setting	10 °C
Setting range	1 to 30 °C

DHW during party mode

This setting defines whether the DHW cylinder (setting "**Yes**") is heated first or whether the system switches directly to heating mode (setting "**No**") when party mode has been activated (see operating instructions).

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"DHW during party"** ("**YES**"/"**NO**")

Standard setting	YES
Setting range	YES/NO

Excess reaction

Coordination of the heat drawn off in the secondary circuit when the heat pump produces an excess of heat or the heat drawn by the secondary circuit is suddenly choked off.

Settings:

0	No heat drawn off
1	Heat will be drawn off only in case of a critical excess, i.e. if critical temperatures were reached in the heat pump circuit or the minimum heat pump runtime has not yet been reached.
2	Heat will be drawn off, even if the excess heat being created is not critical for the heat pump.

Excess reaction (cont.)

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Excess reaction"** (+1/–1)

Standard setting	2
Setting range	0 to 2

Room temperature sensor

If a room temperature sensor is installed, it must be activated for the relevant heating circuit.
For more information on the use of room temperature sensors and remote controls, see page 66.

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Room temperature sensor"** (**"YES"**/**"NO"**)

Standard setting	NO
Setting range	YES/NO

Slope; room temperature hook-up

The slope for room temperature hook-up can be selected, subject to a room temperature sensor being installed and enabled and room temperature hook-up being enabled (see page 176).
The higher the selected value, the greater the influence of the room temperature.

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Heat. room hook-up"** (+1/–1)

Standard setting	10
Setting range	0 to 10

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Room temperature hook-up

Preconditions: Room temperature sensor installed and enabled.
This setting determines when the room temperature hook-up should be enabled in addition to the weather-compensated control.

Settings:

0	No room temperature hook-up
1	Room temperature hook-up only in reduced mode
2	Room temperature hook-up only in standard mode
3	Room temperature hook-up in standard and in reduced mode

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Room temp. hook-up"**
  (+1 / –1)

Standard setting 0
Setting range 0 to 3

Start optimisation

Operating instructions

Maximum flow temperature correction

Preconditions: Room temperature sensor installed and enabled.
Setting the maximum value, by which the flow temperature can be modified by the room temperature hook-up.

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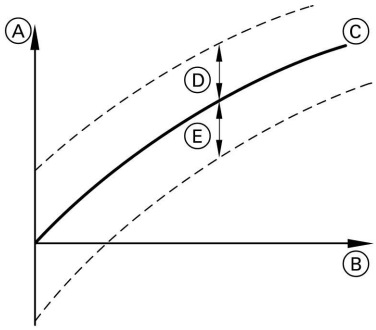
Maximum flow temperature correction (cont.)



Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Max. flow corr."** (+0,1/–0,1)

Standard setting	10.0 K
Setting range	0.1 to 10.0 K

Ⓐ Flow temperature
Ⓑ Differential between set room temperature and outside temperature
Ⓒ Heating curve
Ⓓ Possible positive correction range (0.1 to 10.0 K)
Ⓔ Possible negative correction range (0.1 to 10.0 K)

Room temperature control

A room temperature-dependent control is possible subject to a room temperature sensor being installed and enabled. This function must be activated for this.

Note
*If **"Yes"** is selected for room control, the level and slope of the heating curve can no longer be adjusted (weather-compensated control unit parameters).*

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Room temperature control"** (**"YES"**/**"NO"**)

Standard setting	NO
Setting range	YES/NO

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Adjusting the heating curve level and slope

Operating instructions

Integral room temperature controller

Precondition: "**Room temperature control**" set to "**Yes**".
Integral proportion of the room temperature control circuit. A high value results in a rapid response.

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Integral room temperature controller"** (+5 / –5)

Standard setting	100
Setting range	5 to 1000

Flow T excess

If a mixer circuit is connected (system design 4 and 6), the temperature increase of the secondary circuit is adjusted with regard to the mixer circuit using this function.

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 2"**
- **"Flow T excess"** (+1,0 / –1,0)

Standard setting	0.0 K
Setting range	-10 to 40.0 K

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Mixer runtime

Note
*This setting is only used if parameter set **"1"** (free parameters) has been selected under **"Mixer parameters"**.*

Setting of the time required by the servomotor of the external heating circuit mixer for a **complete changeover** from one operating state into another (90 degree movement).
Excessive runtimes can lead to the heating circuit mixer "Cycling".

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 2"**
- **"Mixer runtime"** (+0,1/–0,1)

Standard setting	0:10 min
Setting range	0:05 to 4:15 min

Mixer parameters

At setting "**0**", the heat pump control unit utilises the function of the KM BUS mixer; the mixer only receives the required flow temperature.
At the "**1**", the mixer parameters of the heat pump control unit (e.g. "**Mixer runtime**") are used to determine the mixer position.

Settings:

0	KM BUS mixer
1	Available parameters

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 2"**
- **"Mixer parameter"** (+1/–1)

Standard setting	0
Setting range	0 or 1

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Screed function

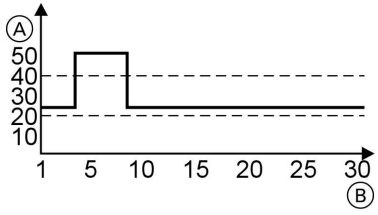
Note
Observe the requirements of DIN 1264-4. The report to be provided by the heating contractor must contain the following heat-up details:
- *Heat-up data with respective flow temperatures*
- *Actual maximum flow temperature*
- *Operating condition and outside temperature during handover*

*The function continues after a power failure or after the control unit has been switched OFF. The selected heating program continues, if the screed function has terminated in accordance with the program or, before its expiry, the temperature/time profile "**0**" is selected.*
The temperature/time profiles 5 to 15 regulate to the maximum flow temperature.
Only one time program can be enabled, even if two heating circuits are connected.

Four different temperature/time profiles are available for screed drying.

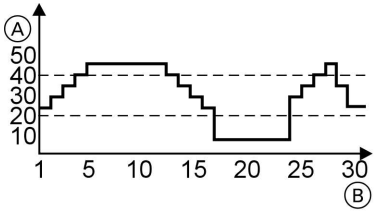
Note
*If "**Building drying time**" has been activated (see page 159), no intervention must occur here.*
*The settings under "**time for drying buildings**" are directly related to this setting. The settings of both functions influence each other.*

Temperature/time profile 1 (in acc. with EN 1264-4)



Ⓐ Flow temperature
Ⓑ Days

Temperature/time profile 2 (to ZV parquet and flooring technology)



Ⓐ Flow temperature
Ⓑ Days

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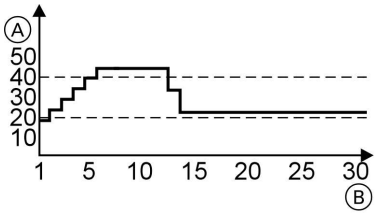
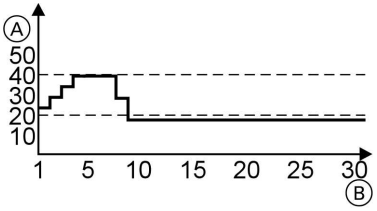
Screed function (cont.)

Temperature/time profile 3 (to ÖNORM)



Ⓐ Flow temperature
Ⓑ Days

Temperature/time profile 4



Ⓐ Flow temperature
Ⓑ Days

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**

- **"Heating circuit 2"**
- **"Screed function"** (+1 / –1)

Standard setting	0
Setting range	0 to 15

Mixer active zone/dead zone

Note
*This setting is only used if parameter set **"1"** (free parameters) has been selected under **"Mixer parameters"**.*

The dead zone Ⓒ determines the fluctuation range around the set flow temperature in which the mixer does not react (is at zero volts).
As soon as the flow temperature leaves this zone (above or below) the mixer motor starts to cycle with a certain pulse modulation (mixer active zone, Ⓑ and Ⓓ).
Outside the active zone, the mixer will be permanently closed Ⓐ (above the active zone) or open Ⓔ (below the active zone).

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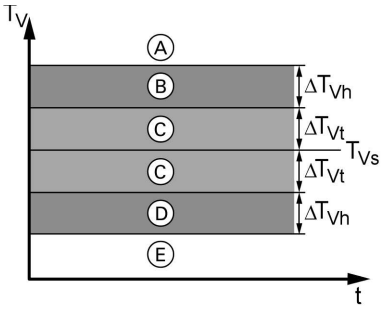
Mixer active zone/dead zone (cont.)



Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Mixer active zone"** (+0,5/–0,5)
  or
  "Mixer dead zone" (–0,1/+0,1)

Ⓐ Mixer permanently closed
Ⓑ Mixer closes (modulating)
Ⓒ Mixer motor at zero volt
Ⓓ Mixer opens
Ⓔ Mixer permanently open
T_V Flow temperature
T_{Vs} Set flow temperature
ΔT_{Vh} Active zone
ΔT_{Vt} Dead zone
t Time

	Standard setting	Setting range
"Mixer active zone"	4.0 K	2.0 to 40.0 K
"Mixer dead zone"	1.0 K	0.5 to 3.0 K

Natural cooling

If all on-site components for the natural cooling function are installed, the system definition must be extended to be able to use that function.
This setting can also be effected via the system configuration (see page 109).

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **Natural cooling** (**"YES"**/**"NO"**)

Standard setting NO
Setting range YES/NO

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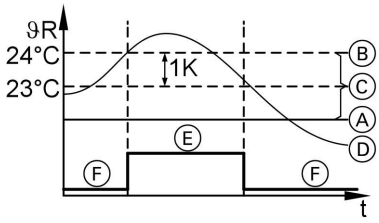
Cooling limit > T room (cooling limit temperature)

Precondition: The natural cooling function is enabled.
The cooling limit temperature defines the outside temperature, exceeding of which triggers the natural cooling function.
The cooling limit temperature is the result of the selected set room temperature and the temperature entered under "**cooling limit > T room**".
Example:
The selected set room temperature is 20 °C; the temperature entered under "**cooling limit > T room**" is 4.0 K. The natural cooling function starts if the average outside temperature exceeds 24 °C (cooling limit temperature).
If the outside temperature drops to less than 23 °C, the natural cooling function is switched off because of the specified hysteresis of 1 K.



Ⓐ Set room temperature
Ⓑ Cooling limit temperature
Ⓒ Selected value "**Cooling limit > T room**"
Ⓓ Average outside temperature
Ⓔ Cooling function ON
Ⓕ Cooling function OFF

Access
- "**Device settings**"
- "**Programming**"
- "**Heating circuit**"
- "**Heating circuit 1/2**"
- "**Cooling limit > T room**" (+0,5/-0,5)

Standard setting	4.0 K
Setting range	2.0 to 20.0 K

Cooling curve level/slope

Precondition: The natural cooling function is enabled.
A specific outside temperature can be assigned to a certain cooling circuit flow temperature using the "**Cooling curve level**" and "**slope** " parameters.
The "**Cooling curve level**" parameter moves the cooling curve along the flow temperature axis, and the "**Cooling curve slope**" parameter assigns a lower flow temperature to the same outside temperature if there is a greater slope.

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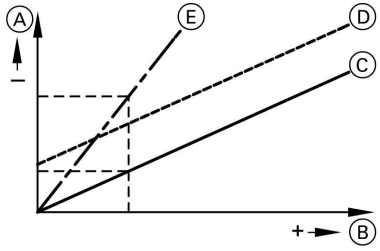
Cooling curve level/slope (cont.)



Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Cooling curve level"** (**"+LEV"**/**"−LEV"**) or **"Heat. cooling curve"** (**"+SLOPE"**/**"−SLOPE"**)

Ⓐ Flow temperature
Ⓑ Outside temperature
Ⓒ Cooling curve
Ⓓ Cooling curve with a higher level (Ⓒ offset)
Ⓔ Cooling curve with a greater slope

	Standard setting	Setting range
"Cooling curve level"	0	-15 to 40
"Heat. cooling curve"	1.2	0.0 to 3.5

Natural cooling with mixer

If a mixer has been used for the natural cooling function and is actuated via the KM BUS, this setting must be set to "**Yes**". This enables the simultaneous fault monitoring.
If the mixer is not controlled via the KM BUS but via an on-site actuator (see Vitocal 200/222/242 technical guide), this setting must be set to "**No**".

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"NC with mixer"** (**"YES"**/**"NO"**)

Standard setting NO
Setting range YES/NO

Active zone/dead zone natural cooling mixer

Note
*This setting is only used if parameter set "**1**" (free parameters) has been selected under "**Cooling mixer parameters**".*

For function description see page 181.

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"NC mixer active zone"**
  (**–0,5** / **+0,5**)
  or
  "NC mixer dead zone"
  (**–0,1** / **+0,1**)

	Standard setting	Setting range
"NC mixer active zone"	4.0 K	2.0 to 40 K
"NC mixer dead zone"	1.0 K	0.5 to 3.0 K

Cooling mixer runtime

Note
*This setting is only used if parameter set "**1**" (free parameters) has been selected under "**Cooling mixer parameters**".*

Setting of the time required by the servomotor of the cooling mixer for a **complete** changeover from one operating state into another (90 degree movement). Runtimes that are too short, can lead to the cooling mixer "Cycling".

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Cooling mixer runtime"**
  (**–1** / **+1**)

Standard setting 0:10 min
Setting range 0:05 to 4:15 min

5592 969 GB

Cooling mixer parameters

Precondition:
The "**NC mixer**" function is enabled.
At setting "**0**", the heat pump control unit utilises the function of the KM BUS mixer; the mixer only receives the required flow temperature.
At the setting "**1**", the mixer parameters of the heat pump control unit (e.g. "**Mixer runtime**") are used to determine the mixer position.

Settings:

0	KM BUS mixer
1	Available parameters

Access
- **"Device settings"**
- **"Programming"**
- **"Heating circuit"**
- **"Heating circuit 1/2"**
- **"Cooling mixer parameters"** (+1/–1)

Standard setting	0
Setting range	0/1

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Buffer cylinder

Note
*This function is only available for **system design 2**.*

When selecting system designs 4 and 6, the buffer cylinder will be defined automatically as a system component.
Should a heating water buffer cylinder be part of a system in accordance with design 2, either set it by selecting option "**Yes**", or via the system configuration (see page 109) or system definition.

Access
- "**Device settings**"
- "**Programming**"
- "**Further menu items**"

- "**Buffer cylinder**"
- **"Buffer cylinder"** ("**YES**"/"**NO**")

Standard setting	NO
Setting range	YES/NO

Buffer cylinder program

Note
*This function is only available in case of **system design 2**, if the option **"Yes"** was selected under **"Buffer cylinder"** (see page 187).*

Operating instructions

Fixed temperature

Note
*This function is only available in case of **system design 2**, if the option **"Yes"** was selected under **"Buffer cylinder"** (see page 187).*
*The temperature cannot be set higher than that selected under **"Max. temperature"** (see page 188).*

Setting of the temperature to which the heating water buffer cylinder is heated, if it is to be heated up and if the "**Fixed value**" program was selected under "**Buffer cylinder prog.**" (see operating instructions).

Fixed temperature (cont.)

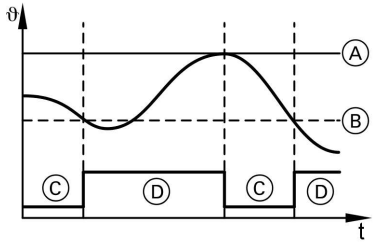
Access
- **"Device settings"**
- **"Programming"**
- **"Further menu items"**
- **"Buffer cylinder"**
- **"Fixed temperature"** (+1,0/–1,0)

Standard setting	50 °C
Setting range	1 to 60 °C

Hysteresis temperature

Note
*This function is only available in case of **system design 2**, if the option **"Yes"** was selected under **"Buffer cylinder"** (see page 187).*

The setting determines the difference from the set temperature at which the cylinder heating is switched on and off.



Ⓐ Set temperature
Ⓑ Start hysteresis
Ⓒ Cylinder heating OFF
Ⓓ Cylinder heating ON

Access
- **"Device settings"**
- **"Programming"**
- **"Further menu items"**
- **"Buffer cylinder"**
- **"Hysteresis temp."** (+1,0/–1,0)

Standard setting	5 K
Setting range	2 to 20 K

Maximum temperature

Note
*This function is only available in case of **system design 2**, if the option **"Yes"** was selected under **"Buffer cylinder"** (see page 187).*

Setting of the maximum temperature in the heating water buffer cylinder.

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Maximum temperature (cont.)

Access
- **"Device settings"**
- **"Programming"**
- **"Further menu items"**
- **"Buffer cylinder"**
- **"Max. temperature"** (+1,0/-1,0)

Standard setting	60 °C
Setting range	1 to 70 °C

Stop optimisation

Note
*This function is only available in case of **system design 2**, if the option **"Yes"** was selected under **"Buffer cylinder"** (see page 187).*

The stop optimisation ensures that, with the selected switching times (see operating instructions), the buffer cylinder is always fully heated at the end of standard mode.

Access
- **"Device settings"**
- **"Programming"**
- **"Further menu items"**
- **"Buffer cylinder"**
- **"Stop optimisation"** ("YES"/"NO")

Standard setting	YES
Setting range	YES/NO

Excess reaction

Note
*This function is only available in case of **system design 2**, if the option **"Yes"** was selected under **"Buffer cylinder"** (see page 187).*

Coordination of the heat drawn off in the secondary circuit when the heat pump produces an excess of heat or the heat drawn by the secondary circuit is suddenly choked off.

Settings:

0	No heat drawn off
1	Heat will be drawn off only in case of a critical excess, i.e. if critical temperatures were reached in the heat pump circuit or the minimum heat pump runtime has not yet been reached.

Excess reaction (cont.)

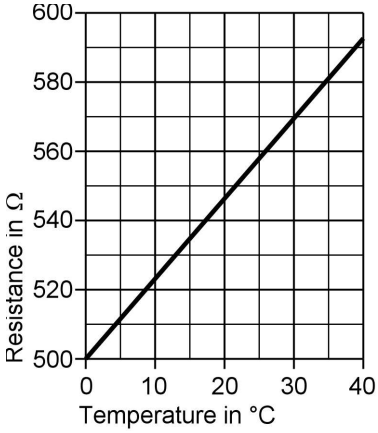
2	Heat will be drawn off, even if the excess heat being created is not critical for the heat pump.

Access
- **"Device settings"**
- **"Programming"**
- **"Further menu items"**
- **"Buffer cylinder"**
- **"Excess reaction"** (+1/–1)

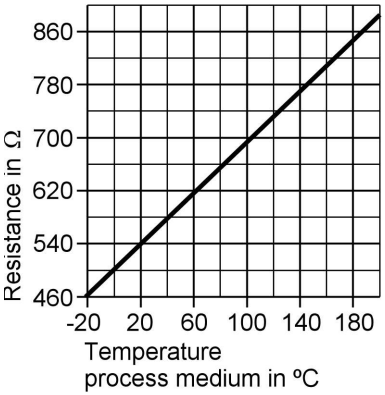
Standard setting	2
Setting range	0 to 2

Sensor resistance curves

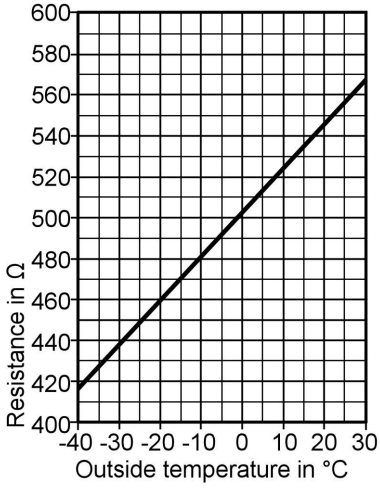
Room temperature sensor (Ni 500)



Internal sensors, temperature sensor in the heating water buffer cylinder and collector temperature sensor (Pt500)



Outside temperature sensor (Ni500)



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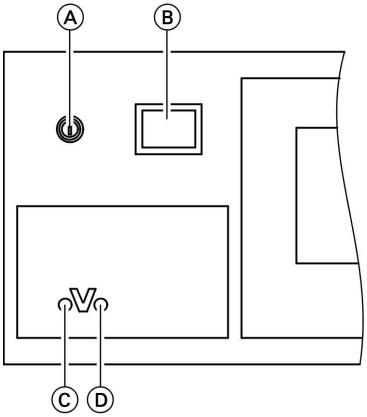
Fuse

The only replaceable fuse is located inside the fuse holder next to the system ON/OFF switch inside the programming unit.



Fuse: 6.3 A (slow), 250 V
max. power loss ≤ 2.5 W

Danger
Touching 'live' components can result in the transfer of dangerous body currents.
Before working on the equipment, always ensure that **the power circuit** is also at zero volt.
Removing the fuse from the programming unit does **not switch the power circuit to zero volt**.

Ⓐ Fuse holder
Ⓑ System ON/OFF switch
Ⓒ Red LED
Ⓓ Green LED

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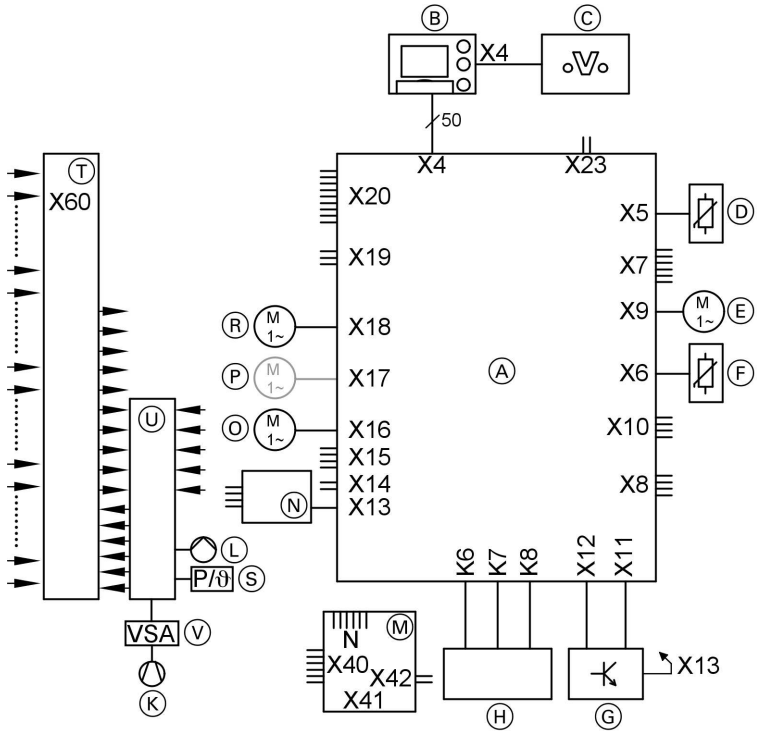
Overview of the PCBs and connection options

Note
No physical layout is shown.



- Ⓐ Main PCB
- Ⓑ Programming unit
- Ⓒ Optolink interface
- Ⓓ Sensors
- Ⓔ Stepper motor (internal)
- Ⓕ Sensors and control inputs
- Ⓖ Power supply unit
- Ⓗ Instantaneous heating water heater
- Ⓚ Compressor with control
- Ⓛ Primary pump
- Ⓜ Auxiliary PCB
- Ⓝ Impressed current anode
- Ⓞ Secondary pump
- Ⓟ Solar circuit pump **(only for the Vitocal 242)**
- Ⓡ Cylinder primary pump
- Ⓢ Safety chain
- Ⓣ Main connecting area in control panel 400/230 V
- Ⓤ Control module with phase monitor
- Ⓥ Full wave soft starter (subject to load)
- X60 Main connection area for external connections on the control panel

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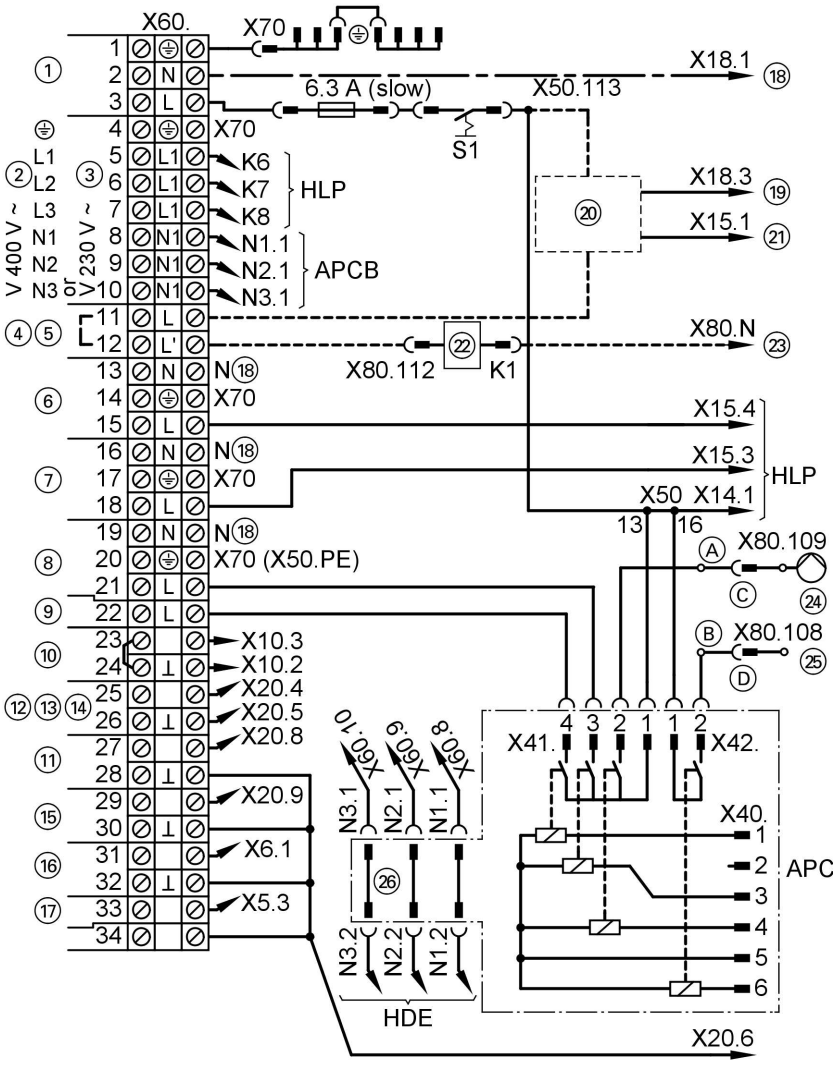
Main connection area



Ⓐ X50.109
Ⓑ X50.108
Ⓒ X90.109
Ⓓ X90.108

① Control unit power supply connection

Main connection area (cont.)

② Instantaneous heating water heater (400 V) power supply connection
③ Instantaneous heating water heater (230 V) power supply connection
④ Brine circuit pressure switch
⑤ Jumper for brine circuit pressure switch, for detailed description see Ⓑ on pages 196 and 197
⑥ Heating circuit pump, direct heating circuit
⑦ DHW circulation pump
⑧ Natural cooling extension kit
⑨ Central fault message
⑩ Power-OFF
⑪ Collector temperature sensor **(only with Vitocal 242)**
⑫ KM BUS: KM BUS distributor
⑬ KM BUS: Vitotrol 200 remote control
⑭ KM BUS: Extension kit for one heating and/or cooling circuit with mixer, for example one connected to the KM BUS distributor
⑮ Room temperature sensor
⑯ Outside temperature sensor
⑰ Heating water buffer cylinder temperature sensor
⑱ Neutral conductor for control with separate RCD circuits
⑲ Signal from refrigerant circuit
⑳ Safety chain, for detailed description see Ⓐ on pages 196 and 197
㉑ Signal from phase monitor (only with 400 V units)
㉒ Compressor contactor, for detailed description see Ⓑ on pages 196 and 197
㉓ Compressor
㉔ Primary pump
㉕ optional
㉖ Neutral conductor, instantaneous heating water heater with separate RCD circuits

HDE To instantaneous heating water heater
HLP to the main PCB
S1 Control unit power switch
X50. Terminals on the inner top hat profile rail **in** the control panel
X60. Main connection area for external connections **on** the control panel
X70. PE support point
X80. **Terminals** at the control module **beneath** the control panel
X90. **Plug-in arrangement** between the control panel and the control module
ZLP Auxiliary PCB

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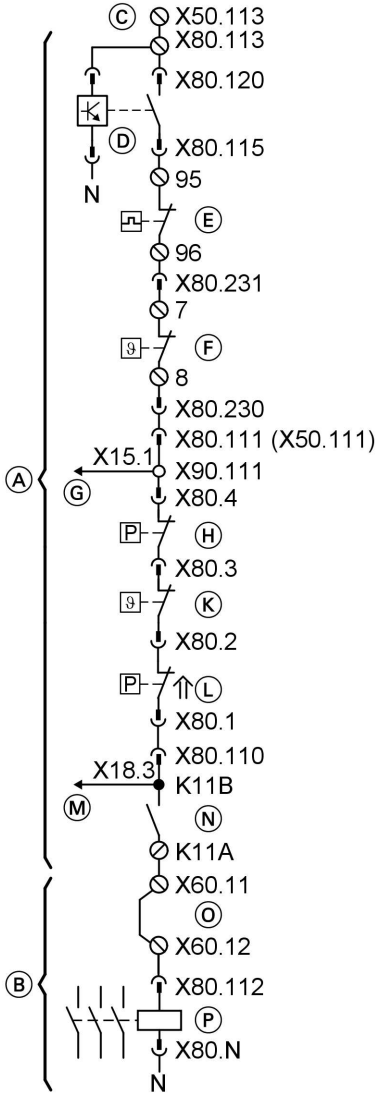
Safety chain, 400 V units



Ⓐ Corresponds to area ⑲ in fig. on page 194

Ⓑ Corresponds to area ⑤ and ㉒ in fig. on page 194
Ⓒ From the ON/OFF switch (see page 194)
Ⓓ Phase monitor
Ⓔ Compressor protective motor switch
Ⓕ Optional thermal contact
Ⓖ Feedback, three phase power monitor to main PCB
Ⓗ Control high pressure
Ⓚ Hot gas temperature limiter
Ⓛ Safety low pressure
Ⓜ Feedback, refrigerant circuit safety chain to main PCB
Ⓝ Compressor relay (PCB)
Ⓞ Brine pressure limiter jumper
Ⓟ Compressor contactor on control module

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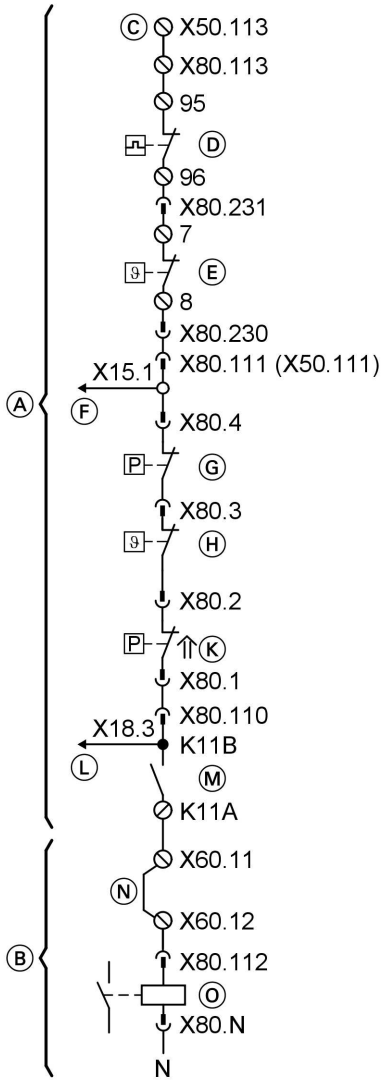
Safety chain, 230 V units



Ⓐ Corresponds to area ⑲ in fig. on page 194

Ⓑ Corresponds to area ⑤ and ㉒ in fig. on page 194
Ⓒ From the ON/OFF switch (see page 194)
Ⓓ Compressor protective motor switch
Ⓔ Full wave soft starter thermal fuse
Ⓕ Feedback, safety chain to main PCB
Ⓖ Control high pressure
Ⓗ Hot gas temperature limiter
Ⓚ Safety low pressure
Ⓛ Feedback, refrigerant circuit safety chain to main PCB
Ⓜ Compressor relay (PCB)
Ⓝ Brine pressure limiter jumper
Ⓞ Compressor contactor on control module

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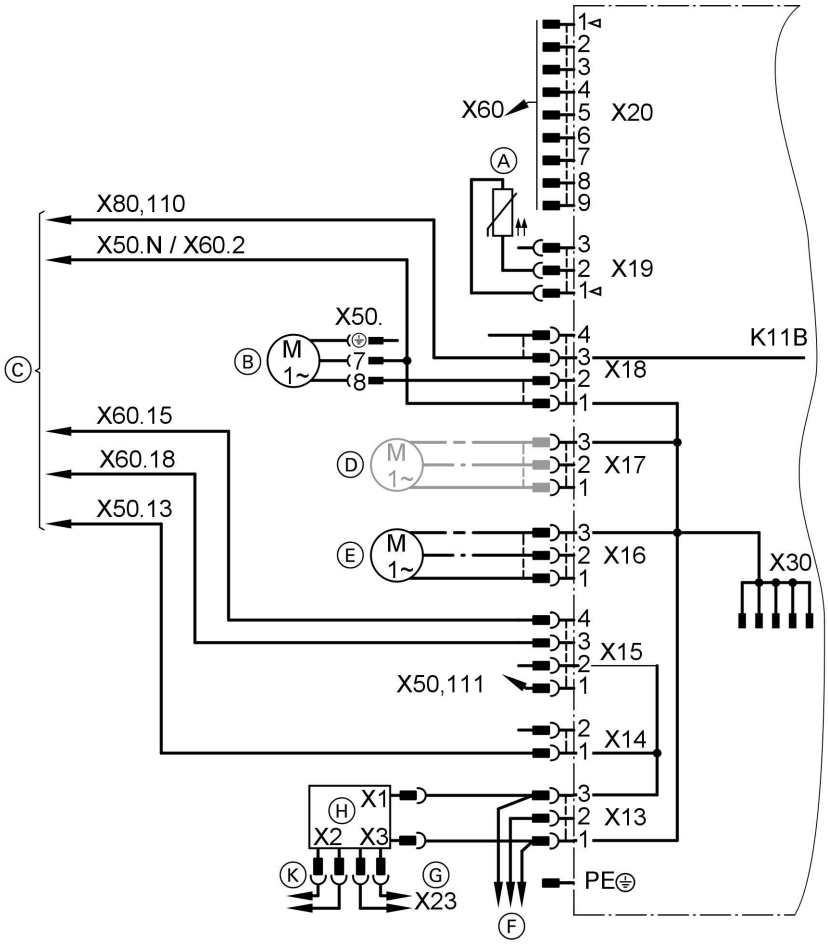
Left part of the main PCB



Ⓐ Secondary return temperature sensor
Ⓑ Cylinder primary pump for integral cylinder loading system
Ⓒ To X50., X60. and X80.
Ⓓ Solar circuit pump **(only for the Vitocal 242)**
Ⓔ Secondary pump
Ⓕ to the power supply unit (see the lower part of the main PCB on page 200)
Ⓖ at Ⓒ on the top of the main PCB (see page 200)
Ⓗ Impressed current anode PCB
Ⓚ To impressed current anode

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Left part of the main PCB (cont.)

X50. Terminals on the inner top hat profile rail in the control panel
X60. Main connection area for external connections on the control panel

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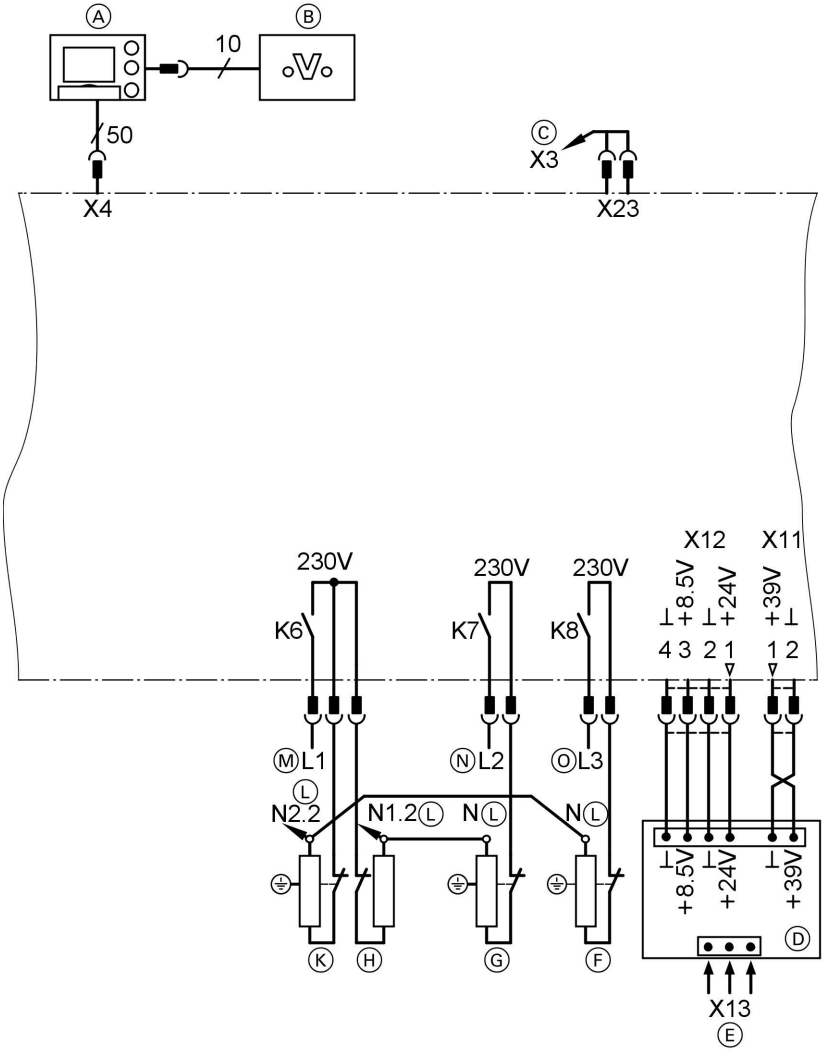
Upper and lower part of the main PCB



Ⓐ Programming unit
Ⓑ Optolink interface
Ⓒ on Ⓗ (impressed current anode PCB) on page 198
Ⓓ Power supply unit
Ⓔ Power supply to the power supply unit 230 V~
Ⓕ Heating element 4 to K8
Ⓖ Heating element 3 to K7
Ⓗ Heating element 2 to K6

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Upper and lower part of the main PCB (cont.)

Ⓚ Heating element 1 to K6
Ⓛ Neutral conductor, instantaneous heating water heater with separate RCD circuits
Ⓜ Supply (L1) heating elements 1 and 2*1
Ⓝ Supply (L2) heating element 3*1
Ⓞ Supply (L3) heating element 4*1

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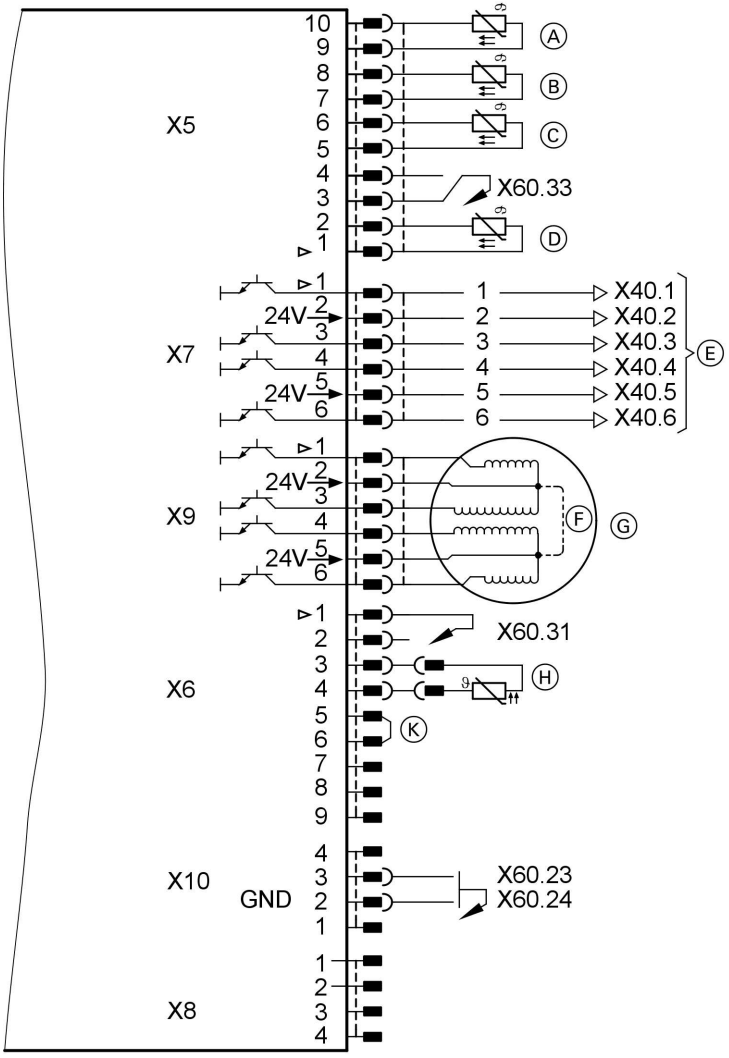
*1 *Central PE conductor point inside the electronics enclosure*

R.h. part of the main PCB



Ⓐ Flow temperature sensor, secondary circuit

Ⓑ Lower cylinder temperature sensor

Ⓒ Return temperature sensor; solar circuit

Ⓓ Upper cylinder temperature sensor

Ⓔ to the auxiliary PCB

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R.h. part of the main PCB (cont.)

Ⓕ alternatively with an internal jumper
Ⓖ Stepper motor mixer heating/ DHW
Ⓗ Flow temperature sensor, primary circuit
Ⓚ Safety chain jumper (DHW SHC)
X60. Main connection area for external connections on the control panel

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Parts list Vitocal 242-G

When ordering spare parts
Quote the part and serial no. (see type plate) and the item number of the required part (as per this parts list). Obtain standard parts from your local supplier.

001 Flange with gasket
002 Dummy flange with gasket
003 Gasket
004 Ti electrode with connecting cable
005 Power PCB CD70
006 Fuse cap
007 Fuse holder
008 Two-pole toggle switch
009 Programming unit CD70
010 Temperature sensor
011 Room temperature sensor
012 Bottom panel
013 Back panel
014 Bottom panel top
015 Angled panel
016 Reinforcing bracket
017 Top r.h. side panel
018 Top l.h. side panel
019 Side panel, right
020 Side panel, left
021 Bottom front panel
022 Front panel, top
023 Top retainer
024 Cover flap
025 Top thermal insulation
026 Lower thermal insulation
027 Container hose
028 Drip container
029 Safety valve R ½", 6 bar
030 Solar circuit circulation pump motor
031 Heating circuit pump motor
032 Three-way valve with stepper motor
033 Quick-acting air vent valve
034 Solar circuit pressure gauge
035 Instantaneous heating water heater 6 kW
036 Retainer, plug-in connector
037 Drain valve R ½"
038 Shut-off valve DN 20
039 Safety assembly DN 20, 10 bar
040 Safety valve R ¾" x R 1", 10 bar
041 Gasket set
042 Gasket set
043 Seal ring R 1"
044 Fixing elements
047 Heat pump module 200/106, 400 V
048 Heat pump module 200/108, 400 V
049 Heat pump module 200/110, 400 V
050 PCB with four relays
051 Impressed current anode PCB
052 Outside temperature sensor
053 Front top panel
054 Top panel, back
056 Brine circuit pump motor, BWT 106, 230/400 V
057 Brine circuit pump motor, BWT 108/110, 400 V
058 SLS circuit pump motor ...
059 Plate-type heat exchanger
060 Diaphragm safety valve 3 bar
061 Corrugated pipe DN 20
062 Three-way ball valve G 1"
063 Fill valve DN 20, G 1" x G 1"
064 Heating circuit pressure gauge
065 Power supply unit 30 W
066 Bottom cover
069 Control unit AS2 for BWT 106, 400 V
070 Control unit AS3 for BWT 108, 400 V
071 Control unit AS4 for BWT 110, 400 V

Parts list Vitocal 242-G (cont.)

072 Full wave soft starter for BWT 108/110, 400 V
073 Phase monitor 400 V
074 Phase monitor strapping plug 400 V
075 Temperature sensor
076 Safety spring
077 Thermocouple
078 Heat pump module 200/106, 230 V
079 Heat pump module 200/108, 230 V
080 Heat pump module 200/110, 230 V
081 Brine circulation pump motor, BWT 108/110, 230 V
082 Control unit AS7 for BWT 106, 230 V
083 Control unit AS8 for BWT 108, 230 V
084 Control unit AS9 for BWT 110, 230 V
085 Full wave soft starter for BWT 106/108/110, 230 V
086 Full wave soft starter capacitor for BWT 106, 230 V
087 Full wave soft starter capacitor for BWT 108, 230 V
088 Full wave soft starter capacitor for BWT 110, 230 V
089 Siphon

Parts not shown

045 Touch-up paint stick, Vitowhite
046 Spray paint, Vitowhite
067 Installation and service instructions
068 Operating instructions
Ⓐ Type plate
Ⓑ DHW cylinder type plate

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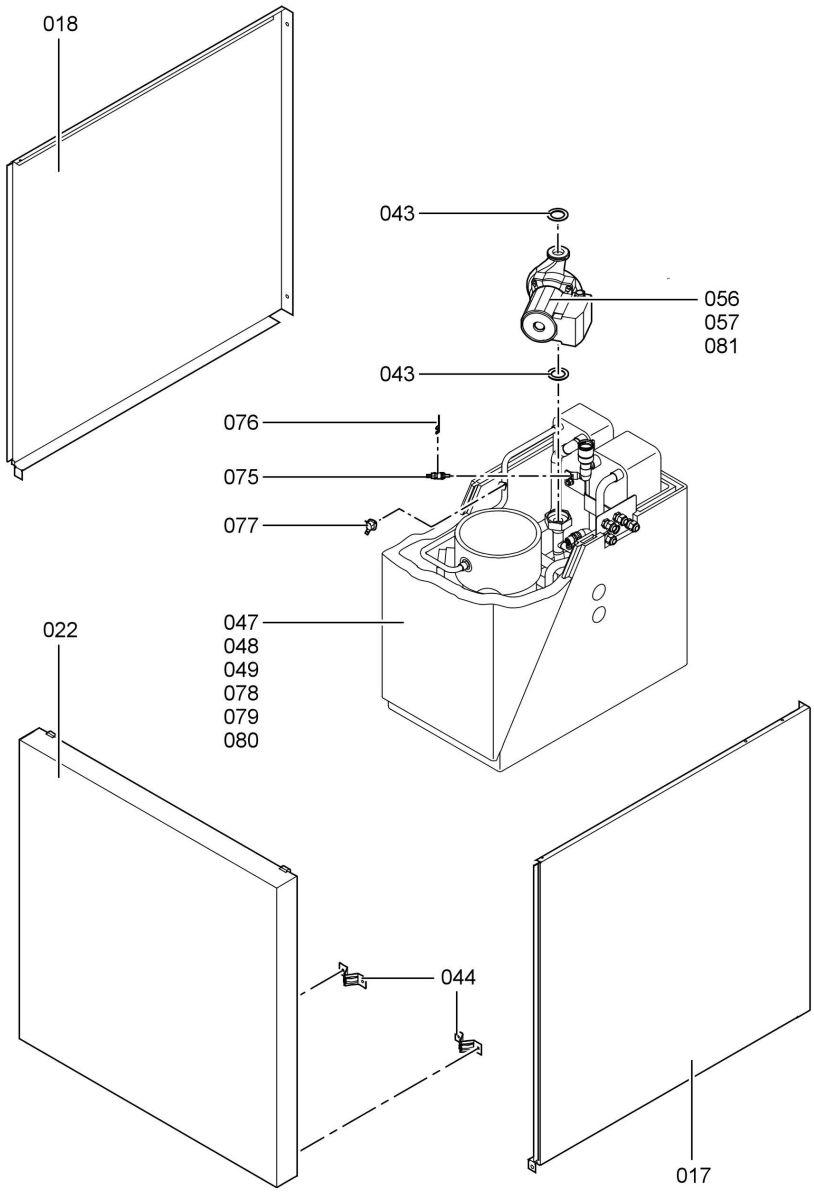
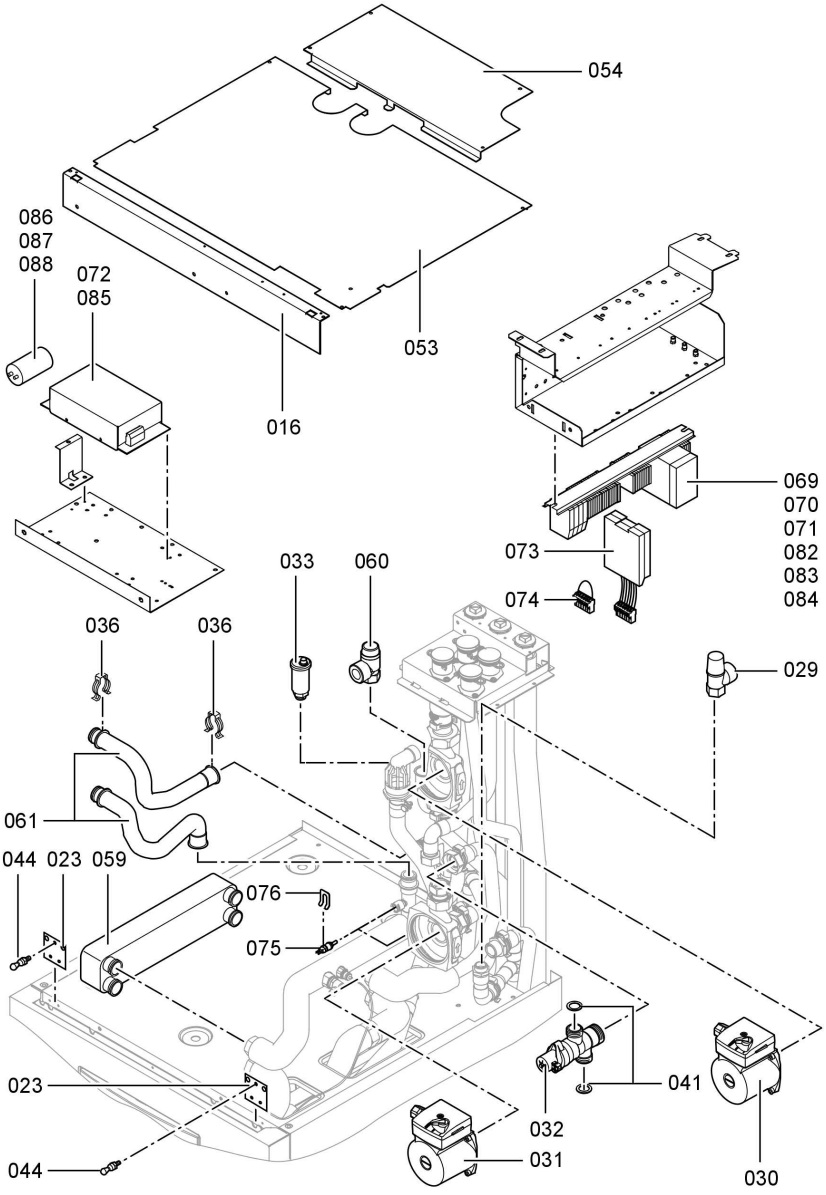
Parts list Vitocal 242-G (cont.)



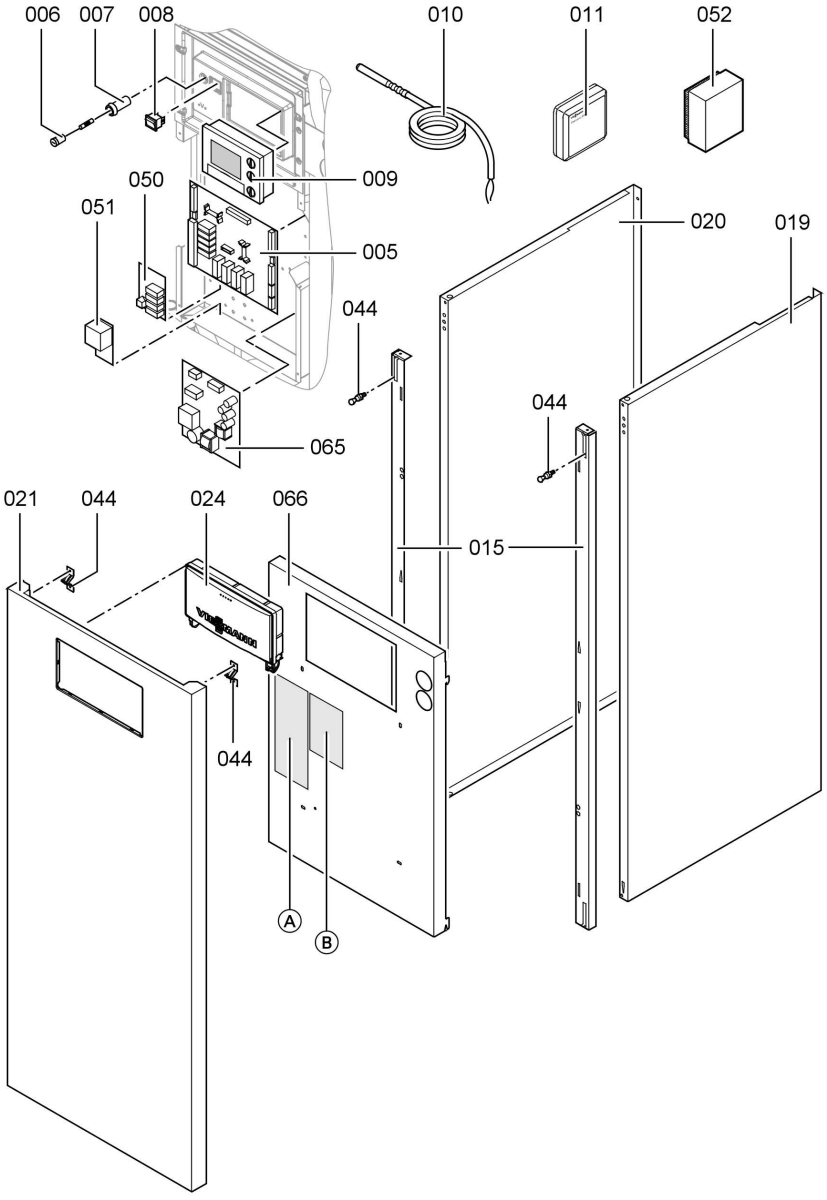
5592 969 GB

Parts list Vitocal 242-G (cont.)



5592 969 GB

Parts list Vitocal 242-G (cont.)



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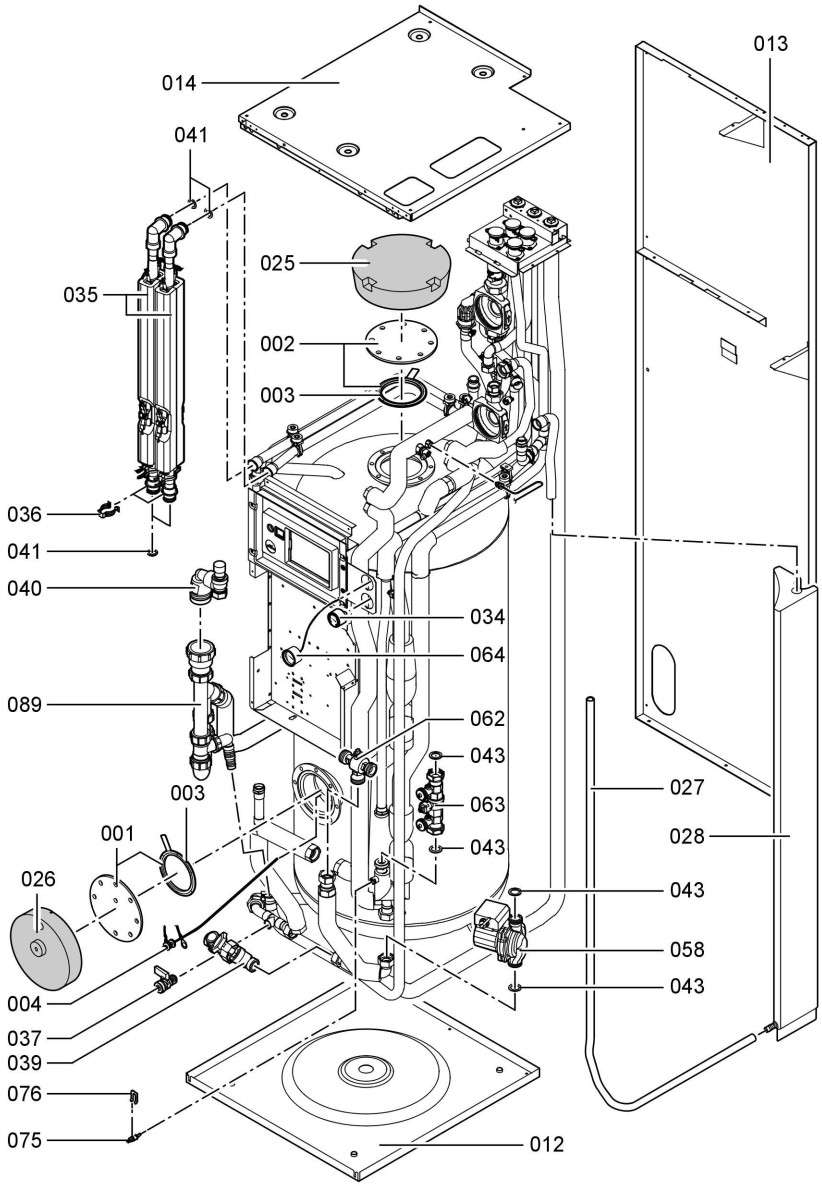
Parts list Vitocal 242-G (cont.)



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Parts list Vitocal 222-G

When ordering spare parts
Quote the part and serial no. (see type plate) and the item number of the required part (as per this parts list). Obtain standard parts from your local supplier.

001 Flange with gasket
002 Dummy flange with gasket
003 Gasket
004 Ti electrode with connecting cable
005 Power PCB CD70
006 Fuse cap
007 Fuse holder
008 Two-pole toggle switch
009 Programming unit CD70
010 Temperature sensor
011 Room temperature sensor
012 Bottom panel
013 Back panel
014 Bottom panel top
015 Angled panel
016 Reinforcing bracket
017 Top r.h. side panel
018 Top l.h. side panel
019 Side panel, right
020 Side panel, left
021 Bottom front panel
022 Front panel, top
023 Top retainer
024 Cover flap
025 Top thermal insulation
026 Lower thermal insulation
031 Heating circuit pump motor
032 Three-way valve with stepper motor
033 Quick-acting air vent valve
034 Solar circuit pressure gauge
035 Instantaneous heating water heater 6 kW
036 Retainer, plug-in connector
038 Shut-off valve DN 20
041 Gasket set
042 Gasket set
044 Fixing elements
047 Heat pump module 200/106, 400 V
048 Heat pump module 200/108, 400 V
049 Heat pump module 200/110, 400 V
050 PCB with four relays
051 Impressed current anode PCB
052 Outside temperature sensor
053 Front top panel
054 Top panel, back
055 Control unit cover
056 Brine circuit pump motor, BWT 106, 230/400 V
057 Brine circuit pump motor, BWT 108/110, 400 V
058 SLS circuit pump motor ...
059 Plate-type heat exchanger
060 Diaphragm safety valve 3 bar
061 Corrugated pipe DN 20
064 Heating circuit pressure gauge
065 Power supply unit 30 W
066 Bottom cover
069 Control unit AS2 for BWT 106, 400 V
070 Control unit AS3 for BWT 108, 400 V
071 Control unit AS4 for BWT 110, 400 V
072 Full wave soft starter for BWT 108/110, 400 V
073 Phase monitor 400 V
074 Phase monitor strapping plug 400 V
075 Temperature sensor
076 Safety spring
077 Thermocouple
078 Heat pump module 200/106, 230 V

Parts list Vitocal 222-G (cont.)

079 Heat pump module 200/108, 230 V
080 Heat pump module 200/110, 230 V
081 Brine circulation pump motor, BWT 108/110, 230 V
082 Control unit AS7 for BWT 106, 230 V
083 Control unit AS8 for BWT 108, 230 V
084 Control unit AS9 for BWT 110, 230 V
085 Full wave soft starter for BWT 106/108/110, 230 V
086 Full wave soft starter capacitor for BWT 106, 230 V
087 Full wave soft starter capacitor for BWT 108, 230 V
088 Full wave soft starter capacitor for BWT 110, 230 V

Parts not shown

045 Touch-up paint stick, Vitowhite
046 Spray paint, Vitowhite
067 Installation and service instructions
068 Operating instructions
Ⓐ Type plate
Ⓑ DHW cylinder type plate

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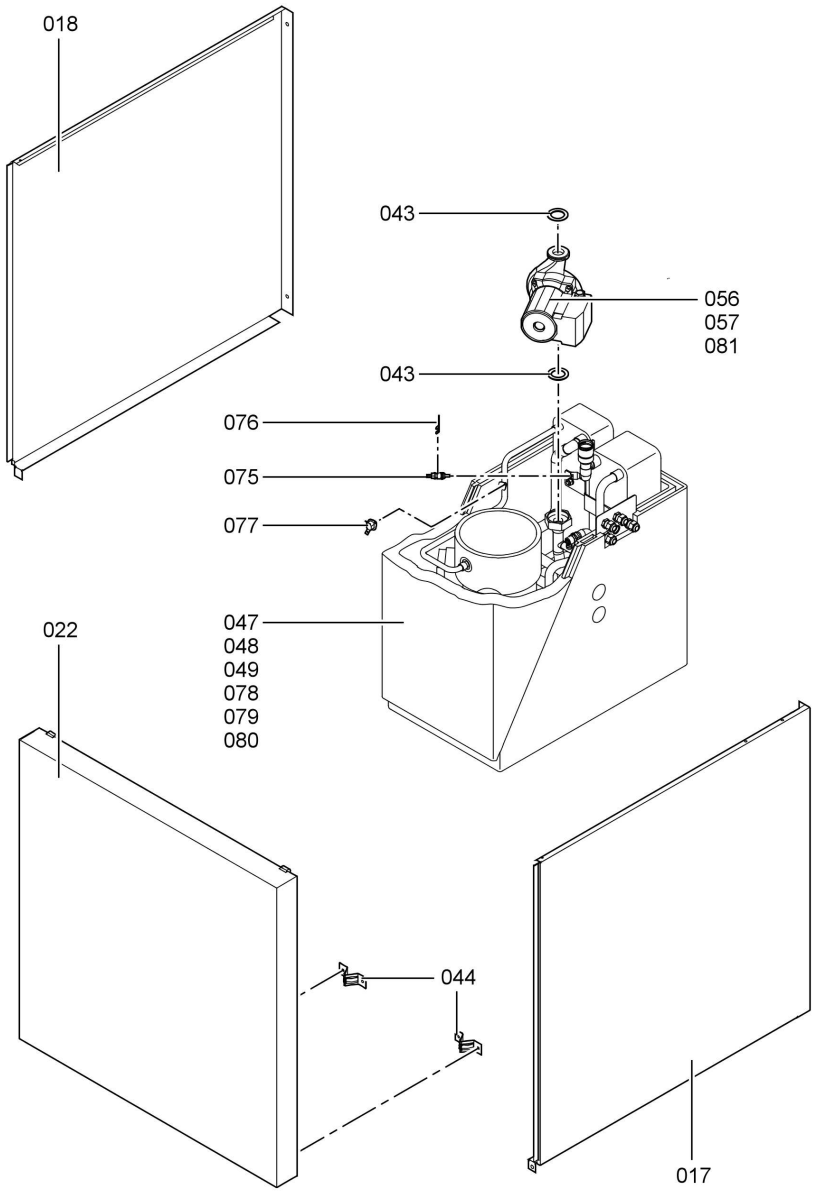
Parts list Vitocal 222-G (cont.)



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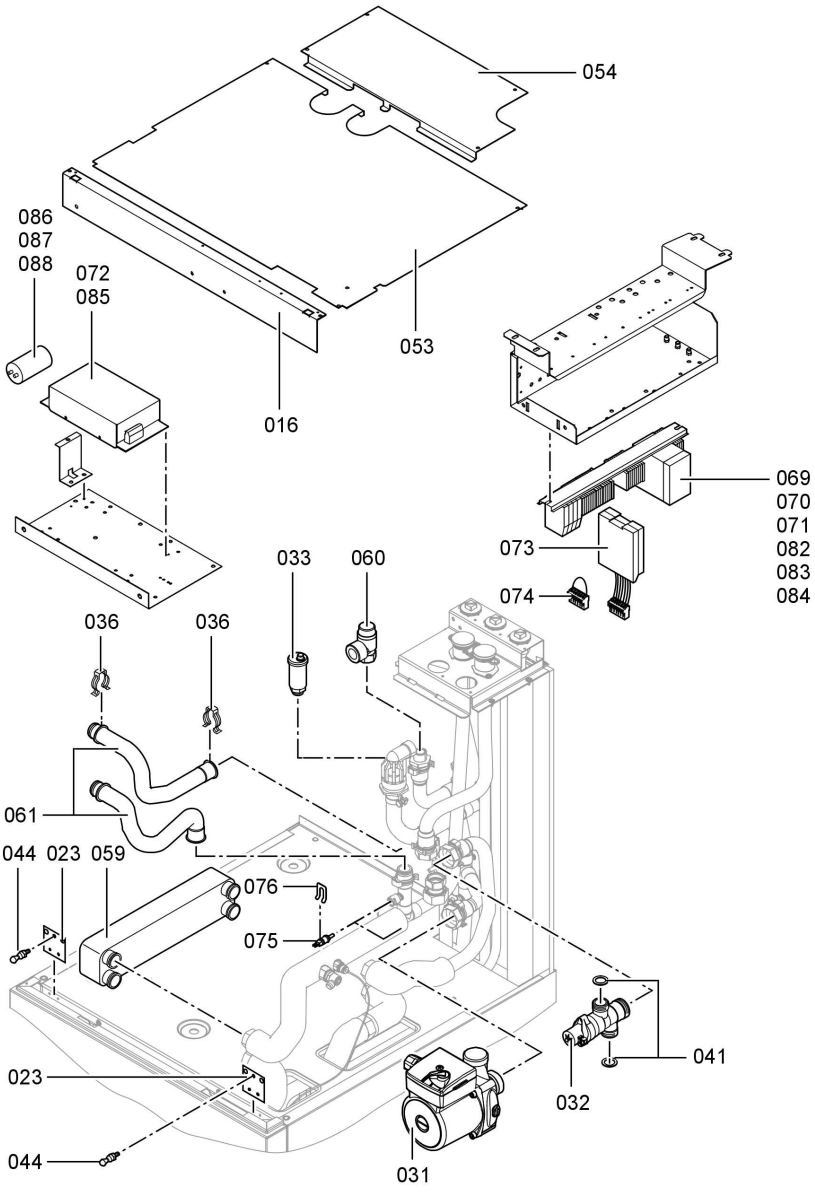
Parts list Vitocal 222-G (cont.)



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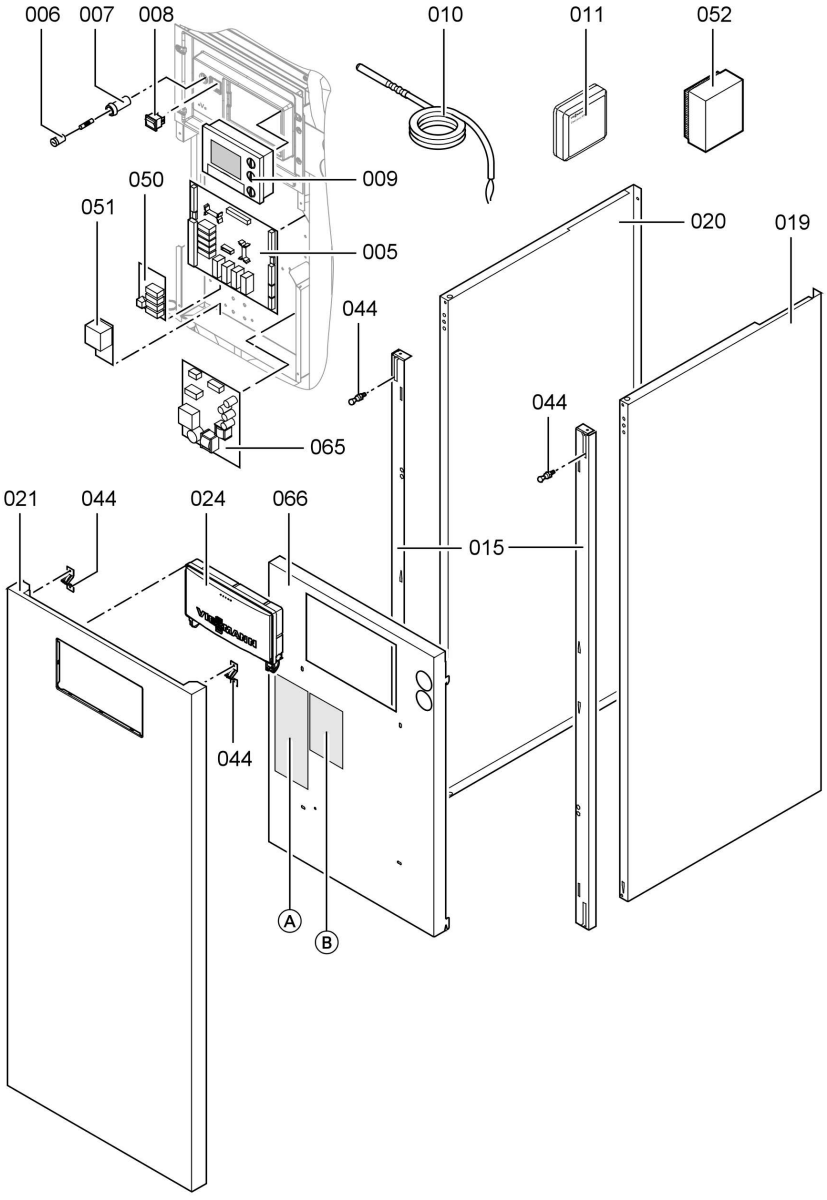
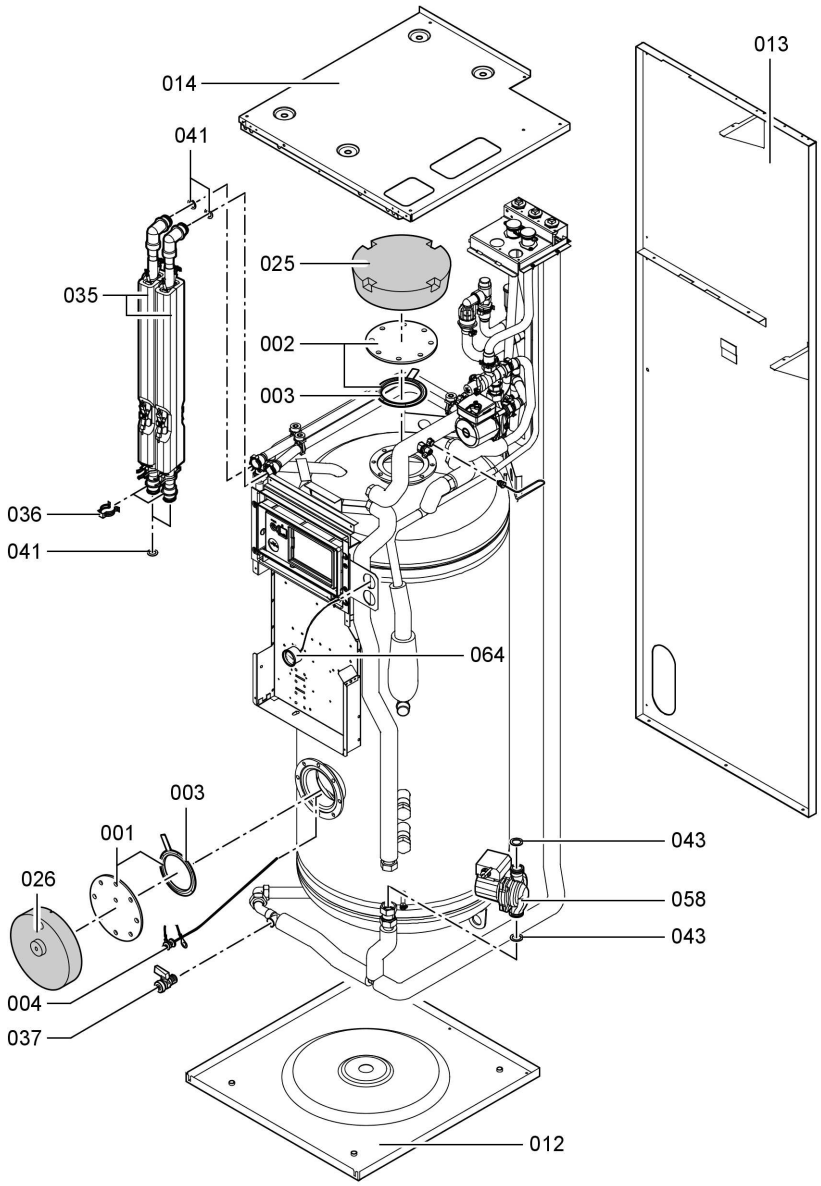
Parts list Vitocal 222-G (cont.)



5592 969 GB

Parts list Vitocal 222-G (cont.)



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Hydraulic parameter report

Setting and test values		Set value	Commissioning
DHW cylinder interior cleaning			
Antifreeze concentration (brine medium)	°C	–15	
Testing the secondary pump			
Temperature "Secondary flow" increased?		Yes	
Temperature "Secondary return" increased?		Yes	
Temperature differential ΔT		≤ 3 K	
Solar circuit pump test (only for Vitocal 242)			
Temperature "Solar return" increased?		Yes	
Testing the external heating circuit pumps			
Heating flow temperature	°C		
Heating return temperature	°C		
Room temperature	°C		
Temperature differential heating flow/ "Buffer cylinder"	K	±2	
Heating return temp. > room temp.		Yes	
Test under the following conditions:			
Circulation pump type			
Circulation pump stage			
Overflow valve setting			
Testing the primary pump			
"Primary in" temperature	°C		
Primary outlet temperature	°C		
Temperature differential ΔT at:			
"Secondary flow" = 35 °C and "Primary in" = 10 °C	K	3 to 5	
or			
"Secondary flow" = 35 °C and "Primary in" = 0 °C	K	2 to 4	
The pump enclosure of the primary cooling circuit pump heats up?		No	
Testing the mixer, heat pump and cylinder heating			
Checked under the following conditions:			
Room temperature	°C		
Outside air temperature	°C		
Mixer and heat pump heating mode			

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Hydraulic parameter report (cont.)

Setting and test values		Set value	Commissioning
Temperature "DHW cylinder top" constant?		Yes (±1 K)	
Temperature "Secondary flow"	°C		from: to:
Heat pump cylinder heating			
Temperature "Secondary flow"	°C		from: to:
Temperature "DHW cylinder top"	°C		from: to:

Control parameter report

Setting parameters	Setting range	Standard setting	Commissioning
System definition			
System scheme	2, 4 and 6*1	2	
Language	*2	Deutsch	
Power-OFF contact: 1S	No/Yes	No	
Average time outside temp.	0:10 to 100:00 h	22:00 h	
Heating limit < T room	0 to 20 K	4 K	
Temperature limit for red. Operating mode	–30 to 30 °C	–30 °C	
Frost protection temperature	–15 to 15 °C	1 °C	
Heat pump			
Power-OFF	No/Yes	Yes	
Max. flow temperature	25 to 60 °C	60 °C	
Min. return temperature	1 to 40 °C	5 °C	
Min. T primary in	–10 to 20 °C	–4 °C	
Hysteresis T brine	1 to 20 K	5 K	
Min. runtime	2:00 to 30:00 min	2:00 min	
Min. compressor off	00:20 to 30:00 min	10:00 min	

*1 *2: one direct heating circuit with hot water; 4: one direct heating circuit, one mixed heating circuit (with buffer); 6: one direct heating circuit, one mixed heating circuit (with buffer).*

*2 *German; English; French; Italian; Swedish; Dutch; Finnish; Polish.*

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Control parameter report (cont.)

Setting parameters	Setting range	Standard setting	Commissioning
Primary pump flow	00:10 to 16:40 min	2:00 min	
Secondary pump flow	00:10 to 16:40 min	2:00 min	
Optimum runtime	00:20 to 24:00 h	2:00 h	
Instantaneous heating water heater			
E heater	No/Yes	Yes	
Power-OFF	No/Yes	Yes	
Electric heating	No/Yes	Yes	
DHW with electric power	No/Yes	Yes	
Max. flow temperature	5 to 75 °C	65 °C	
Heater rod delay	0:00 to 5:00 h	0:30 h	
Electric heating threshold	10 to 30000 K · min	300 K · min	
Max. stage E heater	1 to 3	3	
Internal hydraulics			
Heat pump for drying buildings	No/Yes	No	
Time for drying buildings	0 to 30 days	0 days ("OFF")	
Flow hysteresis	0.5 to 5.0 K	2.0 K	
Internal pump run-on	00:10 to 05:00 min	02:00 min	
Max. steps; three-way valve	-30000 to 30000	320	
Solar collector (only for the Vitocal 242)			
Solar collector	No/Yes	No	
Max. temperature	100 to 300 °C	130 °C	
Solar circuit pump hysteresis ON	3.0 to 20.0 K	7.0 K	
Solar circuit pump hysteresis OFF	1.0 to 15.0 K	3.0 K	
Pump kick hysteresis	3.0 to 20.0 K	3.5 K	
Pump kick runtime	00:01 to 00:20 min	00:02 min	
Pump kick dead time	01:00 to 60:00 min	01:00 min	
Flow rate	10 to 500 l/h	100 l/h	
DHW			
DHW cylinder temperature	10 to 70 °C	50 °C	
DHW program temperature	7-day program	OFF	

Control parameter report (cont.)

Setting parameters	Setting range	Standard setting	Commissioning
DHW circulation pump program	7-day program	OFF	
Operating mode	0 to 6*1	4	
DHW cylinder max.	20 to 80 °C	60 °C	
Electric DHW heating hysteresis	2 to 30 K	10 K	
Hysteresis	1 to 10 K	7 K	
Start optimisation	No/Yes	Yes	
Stop optimisation	No/Yes	Yes	
Auxiliary DHW function	No/Yes	No	
Set DHW temperature	10 to 70 °C	60°C	
Cylinder volume for HP	No/Yes	Yes	
Excess reaction	0 to 2*2	2	
Max. DHW runtime	00:10 to 24:00 h	04:00 h	
Max. DHW interruption	00:10 to 24:00 h	01:30 h	
Heating circuit			
Standard temperature	10 to 30 °C	20 °C	
Reduced temperature	10 to 30 °C	14 °C	
Temp. program HC	7-day program	OFF	
Remote control	No/Yes	No	
Operating mode	0 to 7*3	4	
Max. flow temperature	10 to 70 °C	40 °C	
Min. flow temperature	1 to 30 °C	10 °C	
DHW during party mode	No/Yes	Yes	
Excess reaction	0 to 2*2	2	
Room temperature sensor	No/Yes	No	
Slope, room temperature hook-up	0 to 10	10	

*1 *0: Standby; 1:Reduced; 2:Standard; 3: Fixed value; 4: Rotary selector; 5:External 6: Switching times.*

*2 *0: No reaction; 1: Draw-off only in case of critical excess; 2: Always draw-off.*

*3 *0: Standby; 1: Reduced; 2: Standard; 3: Fixed value (to max. flow temperature); 4: Rotary selector; 5: External (without function); 6: Switching times; 7: Remote control.*

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Control parameter report (cont.)

Setting parameters	Setting range	Standard setting	Commissioning
Room temperature hook-up	0 to 3*1		
Start optimisation	No/Yes	No	
Max. flow correction	0.1 to 10.0 K	10.0 K	
Room temperature control	No/Yes	No	
Heating curve level	–15 to 40 K	0 K	
Heating curve slope	0.0 to 3.5	0.6	
Integral room temperature controller	5 to 1000	100	
Flow T excess	–10 to 40 K	0 K	
Mixer runtime	0:05 to 4:15 min	0:10 min	
Mixer parameters	0/1	0	
Screed function	0 to 15	0 (passive)	
Mixer active zone	2 to 40 K	4 K	
Mixer dead zone	0.5 to 3 K	1 K	
Natural cooling	No/Yes	No	
Cooling limit > T room	2 to 20 K	4 K	
Cooling curve level	-15 to 40	0	
Slope, cooling curve	0.0 to 3.5	1.2	
Natural cooling with mixer	No/Yes	No	
Active zone natural cooling – mixer	2 to 40 K	4 K	
Dead zone natural cooling – mixer	0.5 to 3 K	1 K	
Cooling mixer runtime	0:05 to 4:15 min	0:10 min	
Cooling mixer parameters	0/1	0	
Heating water buffer cylinder			
Buffer cylinder	No/Yes	No	
Buffer cylinder program	7-day program	OFF	
Fixed temperature	1 to 60 °C	50 °C	
Temperature hysteresis	2 to 20 K	5 K	
Max. temperature	1 to 70 °C	60 °C	
Stop optimisation	No/Yes	Yes	

*1 *0: Never; 1: only reduced mode; 2: only standard mode; 3: in reduced and standard mode.*

Control parameter report (cont.)

Setting parameters	Setting range	Standard setting	Commissioning
Excess reaction	0 to 2*[1]	2	

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[1] 0: No reaction; 1: Draw-off only in case of critical excess; 2: Always draw-off.

Specification for 400 V devices

Vitocal 242-G/222-G	Type	BWT 106	BWT 108	BWT 110
Heat pump performance data[*1]				
Heat pump module	Type	200/106	200/108	200/110
Rated output	kW	6.1	7.7	9.7
Refrigerating capacity	kW	4.7	6.9	7.5
Power consumption	kW	1.4	1.8	2.2
Coefficient of performance ∈ (COP) during heating operation		4.3	4.3	4.3
Instantaneous heating water heater performance data Output	kW	stepped 2/4/6		
Max. output (with instantaneous heating water heater)	kW	12.1	13.7	15.7
Brine (primary)				
Capacity	l	1.6	2.1	2.6
Min. throughput[*2]	l/h	1200	1400	1800
Max. external pressure drop	mbar	400	480	380
Max. inlet temperature	°C	25	25	25
Min. inlet temperature	°C	–5	–5	–5
Heating water (secondary)				
Content, heat pump	l	1.6	1.8	2.0
Content, total	l	7.0	7.2	7.4
Min. throughput[*2]	l/h	800	800	800
Max. external pressure drop	mbar	320	320	320
Max. flow temperature	°C	60	60	60
Heat transfer medium (only for the Vitocal 242)				
Capacity	l	16.0	16.0	16.0
Max. external pressure drop	mbar	180	180	180
Electrical values				
Rated voltage (heat pump)		3/N/PE 400 V/50 Hz		

[*1] *At operating point B0/W35 to EN 255: B0 = Brine inlet temperature 0 °C/W 35 = Heating water outlet temperature 35 °C.*
For further operating points, see datasheet.

[*2] *Always safeguard the min. throughput.*

Specification for 400 V devices (cont.)

Vitocal 242-G/222-G	Type	BWT 106	BWT 108	BWT 110
Rated voltage (instantaneous heating water heater)		3/N/PE 400 V/50 Hz		
Rated voltage (control circuit)		230 V/50 Hz		
Rated current (compressor)	A	5.5	6.0	8.0
Starting current (compressor)	A	25.0	14.0*1	20.0*1
Starting current (compressor with stalled armature)	A	32.0	35.0	48.0
Power consumption				
■ Control unit	W	<10	<10	<10
■ Solar circuit pump for stage 1/2/3	W	62/92/132	195/175/120	195/175/120
■ Heating circuit pump for stage 1/2/3	W	45/75/110		
■ Circulation pump for cylinder heating for stage 1/2/3	W	45/66/89		
■ Solar circuit pump **(only for the Vitocal 242)**	W	45		
Fuse protection*2	A	3 × 16	3 × 16*3	3 × 16*3
Protection		IP 20		
Fuse (internal)		6.3 A H (slow)		
Refrigerant circuit				
Refrigerant		R 410 A		
Fill volume	kg	1.05	1.20	1.35
Compressor	Type	Hermetically sealed scroll compressor		
General equipment data				
Dimensions				
■ Total length	mm	677	677	677
■ Total width	mm	600	600	600
■ Total height	mm	2085	2085	2085
■ Height when tilted	mm	2120	2120	2120
Weights Vitocal 242				
■ Total weight	kg	270	280	285

*1 *With starting current limiter (full wave soft starter).*
Required for safeguarding the Z characteristics.
*2 *Only compressor; instantaneous heating water heater is not considered.*
*3 *Z characteristic required.*

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Specification for 400 V devices (cont.)

Vitocal 242-G/222-G	Type	BWT 106	BWT 108	BWT 110
■ Weight, standard device	kg	220	220	220
■ Weight, heat pump	kg	50	60	65
Weights Vitocal 222				
■ Total weight	kg	265	275	280
■ Weight, standard device	kg	215	215	215
■ Weight, heat pump	kg	50	60	65
Permissible operating pressure				
Brine circuit (primary)	bar	4.0	4.0	4.0
Heating water circuit (secondary)	bar	3.0	3.0	3.0
Solar circuit **(only with Vitocal 242)**	bar	6.0	6.0	6.0
DHW cylinder (DHW side)	bar	10.0	10.0	10.0

Specification for 400 V devices (cont.)

Vitocal 242-G/222-G	Type	BWT 106	BWT 108	BWT 110
Connections				
Primary flow and return (brine)		optionally Rp ¾" or Multi-connect system DN 20		
Heating flow and return		Multi-connect system DN 20		
Solar flow and return **(only with Vitocal 242)**		Multi-connect system DN 20		
Cold water, DHW	R	¾"	¾"	¾"
DHW circulation	R	¾"	¾"	¾"
Drain (overflow)	DN	32	32	32
DHW cylinder				
Capacity	l	250	250	250
Continuous DHW output	l/h	200	200	200
DHW performance factor N_L		1.5	1.5	1.5
Max. draw-off rate at the stated DHW performance factor N_L and DHW heating from 10 to 45 °C	l/min	16.8	16.8	16.8
Connectable collector area **(only for the Vitocal 242)**				
■ Vitosol 200-F	m^2	5	5	5
■ Vitosol 200-T, 300-T	m^2	3	3	3
Product parameters (to EnEV [Germany], heating mode without instantaneous heating water heater)				
Rated output	kW	6.1	7.7	9.7
Coefficient of performance $\in_N$ at 0 °C/35 °C		4.3	4.3	4.3
Correction factor "0 °C"		1.087	1.087	1.087
Factor Δt = 7 K		0.995	0.987	0.956
Heating energy expenditure value at 0 °C/35 °C		0.215	0.217	0.221
DHW energy expenditure value at 0 °C/35 °C		0.256	0.257	0.262

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Specification for 230 V devices

Vitocal 242-G/222-G	Type	BWT 106	BWT 108	BWT 110
Heat pump performance data[*1]				
Heat pump module	Type	200/106	200/108	200/110
Rated output	kW	6.2	7.6	9.7
Refrigerating capacity	kW	4.6	5.7	7.3
Power consumption	kW	1.6	1.9	2.4
Coefficient of performance ∈ (COP) during heating operation		3.9	4.0	4.0
Instantaneous heating water heater performance data Output	kW	stepped 2/4/6		
Max. output (with instantaneous heating water heater)	kW	12.2	13.6	15.7
Brine (primary)				
Capacity	l	1.6	2.1	2.6
Min. throughput*[2]	l/h	1200	1400	1800
Max. external pressure drop	mbar	400	480	380
Max. inlet temperature	°C	25	25	25
Min. inlet temperature	°C	–5	–5	–5
Heating water (secondary)				
Content, heat pump	l	1.6	1.8	2.0
Content, total	l	7.0	7.2	7.4
Min. throughput*[2]	l/h	800	800	800
Max. external pressure drop	mbar	320	320	320
Max. flow temperature	°C	60	60	60
Heat transfer medium (only for the Vitocal 242)				
Capacity	l	16.0	16.0	16.0
Max. external pressure drop	mbar	180	180	180
Electrical values Rated voltage (heat pump)		1/N/PE 230 V/50 Hz		

*[1] *At operating point B0/W35 to EN 255: B0 = Brine inlet temperature 0 °C/W 35 = Heating water outlet temperature 35 °C.*
For further operating points, see datasheet.

*[2] *Always safeguard the min. throughput.*

Specification for 230 V devices (cont.)

Vitocal 242-G/222-G	Type	BWT 106	BWT 108	BWT 110
Rated voltage (instantaneous heating water heater)		1/N/PE 230 V/50 Hz		
Rated voltage (control circuit)		230 V/50 Hz		
Rated current (compressor)	A	16	19	23
Starting current (compressor)*1	A	<45	<45	<45
Starting current (compressor with stalled armature)	A	61	82	97
Power consumption				
■ Control unit	W	<10	<10	<10
■ Solar circuit pump for stage 1/2/3	W	62/92/132	165/133/87	165/133/87
■ Heating circuit pump for stage 1/2/3	W	45/75/110		
■ Circulation pump for cylinder heating for stage 1/2/3	W	45/66/89		
■ Solar circuit pump **(only for the Vitocal 242)**	W	45		
Fuse protection*2	A	1 × 25		
Protection		IP 20		
Fuse (internal)		6.3 A H (slow)		
Refrigerant circuit				
Refrigerant		R 410 A		
Fill volume	kg	1.05	1.20	1.35
Compressor	Type	Hermetically sealed scroll compressor		
General equipment data				
Dimensions				
■ Total length	mm	677	677	677
■ Total width	mm	600	600	600
■ Total height	mm	2085	2085	2085
■ Height when tilted	mm	2120	2120	2120
Weights Vitocal 242				
■ Total weight	kg	270	280	285

*1 *With starting current limiter (full wave soft starter). Required for safeguarding the Z characteristics.*

*2 *Only compressor; instantaneous heating water heater is not considered. Z characteristic required.*

Specification for 230 V devices (cont.)

Vitocal 242-G/222-G	Type	BWT 106	BWT 108	BWT 110
■ Weight, standard device	kg	220	220	220
■ Weight, heat pump	kg	50	60	65
Weights Vitocal 222				
■ Total weight	kg	265	275	280
■ Weight, standard device	kg	215	215	215
■ Weight, heat pump	kg	50	60	65
Permissible operating pressure				
Brine circuit (primary)	bar	4.0	4.0	4.0
Heating water circuit (secondary)	bar	3.0	3.0	3.0
Solar circuit **(only with Vitocal 242)**	bar	6.0	6.0	6.0
DHW cylinder (DHW side)	bar	10.0	10.0	10.0
Connections				
Primary flow and return (brine)		optionally Rp ¾" or Multi-connect system DN 20		
Heating flow and return		Multi-connect system DN 20		
Solar flow and return **(only with Vitocal 242)**		Multi-connect system DN 20		
Cold water, DHW	R	¾"	¾"	¾"
DHW circulation	R	¾"	¾"	¾"
Drain (overflow)	DN	32	32	32
DHW cylinder				
Capacity	l	250	250	250
Continuous DHW output	l/h	200	200	200
DHW performance factor N_L		1.5	1.5	1.5
Max. draw-off rate at the stated DHW performance factor N_L and DHW heating from 10 to 45 °C	l/min	16.8	16.8	16.8
Connectable collector area **(only for the Vitocal 242)**				
■ Vitosol 200-F	m^2	5	5	5
■ Vitosol 200-T, 300-T	m^2	3	3	3

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Order to commission the Vitocal 242/222

Please fax this order, together with the enclosed system layout, to your local Viessmann sales office.
We would ask that a competent employee of yours be present during the commissioning.

Ordering party: .....
.....

System location: .....
.....
.....

Please tick these check points:

□ Hydraulic diagram for system versions 1□ 2□ 3□ 4□ enclosed. In case of alternative designs: Diagram enclosed □.
□ Heating circuit completed and filled.
□ Electrical installation completed.
□ Pipework fully insulated

□ Windows and external doors fully set and sealed in.
□ Solar option completed. (only for Vitocal 242)
□ Cooling option completed.
□ Ground probes and interconnecting lines completed.

Requested date:

1. **Date:** ..... **Time:** .....
2. **Date:** ..... **Time:** .....

All work ordered from Viessmann will be charged to me/us in accordance with the current Viessmann pricelist.

Place/Date: .....
Signature: .....

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Declaration of conformity

Declaration of conformity for Vitocal 242-G

We, Viessmann Werke GmbH&Co KG, D-35107 Allendorf, declare as sole responsible body, that the product **Vitocal 242-G incl. CD 70 heat pump control unit** complies with the following standards:

AD Codes of Practice	EN 60 252-1
DIN 4753	EN 60 335-1
DIN 8901	EN 60 335-2-40
EN 292	EN 61 000-3-2
EN 294	EN 61 000-3-3
EN 349	ISO 5149
EN 378	VDE 0100-430
EN 55 014-1	VDE 0298-4
EN 55 014-2	VGB 20

In accordance with the following Directives, this product is designated with CE:

89/336/EC	98/37/EC
97/23/EC	2006/95/EC

Cylinder details according to the Pressure Equipment Directive (97/23/EC):
- Heated pressure vessel, not at risk from overheating
- Class I according to appendix II, diagram 2
- Module A according to appendix III
- Materials according to AD Code of Practice, individual assessment and appendix I, 4.2, b)
- Corrosion allowance in accordance with appendix I, 2.2 and AD Code of Practice.

The product characteristics determined as system values for the product **Vitocal 242-G** as part of **EC type testing according to the Efficiency Directive** (see specification table), can be utilised to assess the energy consumption of heating and ventilation equipment to DIN V 4701-10 which is specified by the EnEV [Germany].

Allendorf, 16 March 2007

Viessmann Werke GmbH&Co KG

pp. Manfred Sommer

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Declaration of conformity

Declaration of conformity for Vitocal 222-G

We, Viessmann Werke GmbH&Co KG, D-35107 Allendorf, declare as sole responsible body, that the product **Vitocal 222-G incl. CD 70 heat pump control unit** complies with the following standards:

AD Codes of Practice	EN 60 252-1
DIN 4753	EN 60 335-1
DIN 8901	EN 60 335-2-40
EN 292	EN 61 000-3-2
EN 294	EN 61 000-3-3
EN 349	ISO 5149
EN 378	VDE 0100-430
EN 55 014-1	VDE 0298-4
EN 55 014-2	VGB 20

In accordance with the following Directives, this product is designated with CE:

89/336/EC	98/37/EC
97/23/EC	2006/95/EC

Cylinder details according to the Pressure Equipment Directive (97/23/EC):
- Heated pressure vessel, not at risk from overheating
- Class I according to appendix II, diagram 2
- Module A according to appendix III
- Materials according to AD Code of Practice, individual assessment and appendix I, 4.2, b)
- Corrosion allowance in accordance with appendix I, 2.2 and AD Code of Practice.

The product characteristics determined as system values for the product **Vitocal 222-G** as part of **EC type testing according to the Efficiency Directive** (see specification table), can be utilised to assess the energy consumption of heating and ventilation equipment to DIN V 4701-10 which is specified by the EnEV [Germany].

Allendorf, 16 March 2007

Viessmann Werke GmbH&Co KG

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Applicability

Applicable for heat pumps:
Brine/water heat pump
Vitocal 242-G/222-G, type BWT 106, 108 and 110
400 V and 230 V

With the **standard equipment** from serial no:
7288 308 7 01000 ... **(Vitocal 242-G)**
7286 654 7 01000 ... **(Vitocal 222-G)**
With the **heat pump module** from serial no:
7278 656 6 01000 ... (200/106, 230 V)
7278 657 6 01000 ... (200/108, 230 V)
7278 658 6 01000 ... (200/110, 230 V)
7282 751 6 01000 ... (200/106, 400 V)
7282 752 6 01000 ... (200/108, 400 V)
7282 753 6 01000 ... (200/110, 400 V)

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